

February 1, 1930

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AVIATION

The Oldest American Aeronautical Magazine

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According to the agreement between Colonel Lindbergh and the Lockheed Corporation, the plane was not to be paid for until its performance was satisfactory. In California last month Colonel Lindbergh took delivery of the first Lockheed Sirius and expressed his approval of the design. As a result of the performance tests of Colonel Lindbergh's plane, the Sirius has been made a standard model in the famous Lockheed line.



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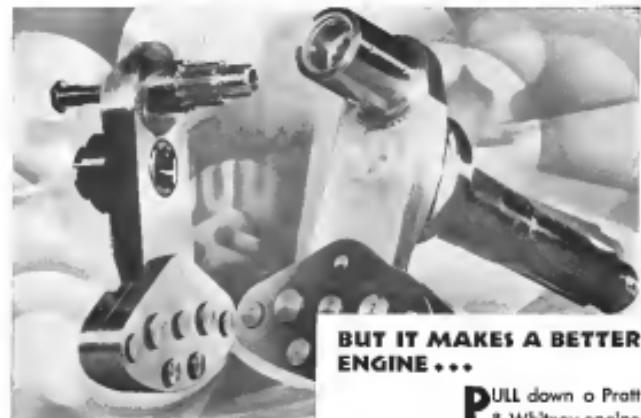
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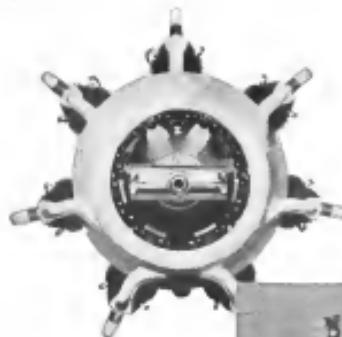
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As applied to the aircraft industry in Los Angeles County, these factors mean uninterrupted operation and additional profits for the manufacturer.

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THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

A MONTHLY PUBLICATION . . . ESTABLISHED 1884

EDWARD P. WARNER, Editor

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Back to 1910

PIONEER HISTORY is repeating itself. The days of country fair flying are coming back. The Curtis and Wright set their teams forth to display their products to a gaping throng twenty years ago, as now a great merchandising organization is planning a tour of the country by a group of representative commercial aircraft, under the guidance of a famous impresario of speedway and hippodrome.

We hope for the best, but we await the outcome with some misgivings. It is a little doubtful if even the current showmen will be able to wring a crowd into going out to look at standard commercial products, such as operate regularly at the airport, without putting on a display that will alienate them from any notion of personal flying. The National Air Tour may soon be contrived to quiet that fear, but then the competitive element has to be considered as a powerful factor of the attraction.

Nevertheless, and however this mass presentation of standard products may turn out, it has the germs of a very fertile propaganda. Shortly after the first public displays at Pomona and the first meet at the old Dominguez Field in Los Angeles the public was eager to see straight flying by any airplane, because any airplane was a novelty. Two years ago the Ford Motor Company used a plane on tour, and signs the public turned out in mass early to gaze, for in most communities a multi-engined all-metal transport plane was still a novelty. The same game can be worked again, and repeatedly, given out only showmanship in presenting the display but a definitely lucious element in the show itself.

Let us be specific. We have repeatedly made it clear that we are without qualification opposed to the public meeting of non-aviatory aviators before crowds of people. If we, we are satisfied, the worst possible

publicity. On the other hand, there is flying that is normal and confidence-inspiring and yet outside the experience of the ordinary observer. These are airplane flights of which the repetition assures an interested audience.

Let us be more specific still. A concrete example of what we have in mind is furnished by the recent winner of the Graggenauer Safety competition. For the Curtis Twister go racing, and it will need but little stage management to get an audience. The crowd will gather in see straight but passengers flying over now, as they did when Brooks and McCurdy, both of them now captains of industry, were heroes of the hour. A audience which does not even need an airport, but which is inherently able to land in a tennis court and take off from a football field, is going to give not only the aviation fans but the lay public a broad-new idea of flying. We venture to express the hope that the citizens of many scores of communities will be given the opportunity of seeing demonstrations similar to that offered at Mitchell Field on the day when the safety prize was awarded.

If it were only the financial future of the builders of the winning airplane that would be involved in such a tour, it would be imprudent for us to offer any suggestions. They are perfectly capable of deciding for themselves what will best promote their interests. Our concern is for the general good of aeronautics, and we can think of nothing that would be more helpful than to capitalize upon the really sensational display displayed in the course of the Graggenauer competition.

We need to convince the public that flying is safe. To show them airplanes that can be piled off the ground at barely thirty miles an hour and at a thirty degree angle, that remain under control under the most absurd and aggravated flight conditions and

In defiance of the most deliberately bad piloting, that can be flown straight back into the ground without any measures for landing and without injury, will be worth many pages of argument. We only regret that the legal disputes between the women and their closest competitors obviate any prospect of having the two go on a grand circuit of displays together. As matters stand, all possible publicity should be drawn from (not merely for) the women. The same course should be followed with any other airplane that promises exceptional and obvious and guaranteed and spectacularly demonstrable contribution to safety, reliability, or economy. "Hippodroming" can be brought back in 1939 if the right planes and the right methods are used, and hippodroming can be made respectable.



The Glider Game

THREE WAS A GREAT WAVE of glider activity in America some twenty years ago. Scores of groups of youths, fired with enthusiasm by accounts of the first public display by the Wrights and Curtiss, began energetically to assemble odd bits of lumber and sheets of fabric into structures of more or less questionable rigidity and safety. An intercollegiate association soon progressed to the point of staging an intercollegiate glider meet, more nearly self-sustained than any aerostatic event that the colleges have held since, for the contestants designed their own machines, built them, flew them, and managed their own show without exterior control and with only very limited assistance by interested experts and faculty members.

It passed. In 1916 gliding, with the exception of sporadic efforts by a few very scattered experimenters, seemed to have joined the Great Ark in the limbs of extinction.

Nineteen twenty-two brought it back, washed in a tide of wunderful stories from beyond the Rhine. The Germans had adopted gliding perfectly, under pilotless constraint, and had presented with scientific thoroughness to raise maximum airplane performance to levels therefore undreamed of. The real explosion of those-year glider flocks too simple for the layman to credit, some of the journalistic workers in the camp in the Rhinegebirge proceeded to create much more land and more plausible theories of their own, and to repeat their readers with seasons of favorite anecdotes. The excitement spread apace.

The German experts produced glider construction and glider meets in France, England, Algiers, Russia, and Switzerland. In America they produced little except a wealth of speculative conversation. The plan to hold an American meet slipped into oblivion after some abortive attempts to find a suitable site, and by 1925 gliding

was again, as it had been four years earlier, an almost purely German pastime.

Now it has returned to American skies, again flourished from a German root, and it comes under more favorable aspects than on any previous occasion. It is being gauged with more energy than ever before, and a definite appeal is being made for the support of the aircraft industry, upon the theory that the glider will lead its users toward the market for power-driven aircraft. Is it worth while?

We think it is—upon certain conditions and with certain reservations. We do not see in gliding, nor in model flying, any prospect of pronounced addition to the aircraft market. Presently all of the young glider enthusiasts of our acquaintance yearn toward aerodynamics as a profession. They want to become pilots, designers, executives. They want to take money out of the industry, not put it in. Some of those who start on the glider will be drawn from wealthy families, will take up the sport partly as such, and will ultimately buy planes for personal use, but they will, we believe, be relatively few. The real use of the glider is aviation, not elsewhere.

It lies in making aviation seem normal to a larger part of the public. It lies in striking another blow at the "impossible" notion. Mr. Simeon Pish, prosperous insurance broker, will probably never fly a glider, but when he finds that his young brother and his nephew and the nephew's boy across the street are soaring upon the wings of the wind he will find it difficult to continue thinking of aviation as something remote and mysterious—and he may decide to take the auto upon his next trip to the coast, and reflect very seriously upon the desirability of having an office plane for his associates and himself to do their traveling in. Therein, from our point of view, and quite apart from its place as a sport, gliding will have earned its keep.

But there are conditions and reservations. Gliding with a rapidly lengthening drift roll would be worse than no gliding at all. The home-made glider must be steadily winched. The fledgling pilot's soaring ambitions must be kept within bounds. Gliders must be content to go slowly, and to get plenty of advice as they go. Seasoned aeronautical experts will have to give freely of their counsel.

There is ample experience to show that gliding under proper control can be both safe and exciting. It cannot acquire a great vogue in America simply by a移译 from Germany. The German work is admirable. We cannot praise it too highly, but it has hitherto been planned with special reference to German geography, economic conditions, educational systems, and temperament. In requires definite adaptation to American conditions, with appropriate modifications in the methods of practicing the pastime. The National Glider Association, by promoting gliding under a responsible policy, by revealing the exaggerated drama and exaggeration to which propagandists often

call gliders, by critically and separately judging each of its own proposed activities by the definite criteria that make famous for American aviation, will earn support and will receive it.



Selling Airplanes, Not Stunts

SOMEWHERE BETWEEN the extremes of glider flights and beautiful precision among the aircraft industry of today there has a natural middle ground of fact. There is a change, impelling, and prepossessing colors our interpretation of the perfectly natural turns of work.

The true aviation is relatively simple. We appear to be approaching the saturation point of the present airplane market, under proper selling policies. Aviation has had a real selling policy it has been chiefly expressed by exploiting the sensational flying activity of certain individuals, and inviting all the world to buy a plane and do likewise, or better. Every manufacturer of planes has probably glorified in the record-breaking achievements of star performers using his planes.

All this speculation about the current aviation situation comes as an indication that the business of aviation has arrived its purpose, and that we are entering the business era of aircraft development. Every successful industry sooner or later enters this dollar-and-euro phase, and by its achievements there, and there alone, measures its true worth to modern world progress and stable financial success.

Common sense will readily reveal that no business, and aviation is after all a business, can indefinitely continue solely as a house, romantic plane. The fall between is not the expression of some inflexible law of cycles, but only an interlude of readjustment which can be measured by reasonable analysis and logical anticipation.

The man who is still too much of a hero in the public eye, a sort of superman to be admired and idealized. The great pioneers deserve our tribute, and to then all honor and credit is due, but aviation is growing up, and genuine business success is not founded on heroes.

Each new milestone in aviation achievement is now centered about the man who flew the job. The daily press exclaims for fact, the manufacturer has his sales argument on it, the vast army of aspirants to the aircraft industry proudly broadcast their part in his success, and the man in the street applauds and stays on the ground. The unusual performance, the spectacular flight, the record breaking event—all are dramatized in terms of the pilot, and the simple project is literally doted by the glory of this band of masterful men.

The aviation industry, in its broadest sense, willingly participates in this hero cult, for in addition to a genuine admiration for their achievements, it regards

them as good publicity. Up to what point are they really good publicity? The neck of the bottle is increased aerostatic activity is increased sales development—and this in turn is very definitely helped by the number of men available to fly the planes.

Much has been said about the necessity of finding some easier and less expensive method of making flight training available to the average individual. Undoubtedly this will come in due course, either through reduced costs through present flying school channels, or by including flight training in the purchase price of a plane. One thing is certain, however, that the men we bring to flight training a group of prospects who are attracted by practical interests in aviation, and who bring to that training an experience, position and degree of responsibility in the business world that ensures practical success, the more we will increase the sales of planes. The day of the name boy with background attributed to flying chiefly because of his heroic pastime, and bringing to his training little more than vague interest and desire, is no more.

The management of an air line is essentially like the direction of any other transportation enterprise, and it is significant that among the most successful operators are several with previous motor bus or taxi cab experience. The pilot of an air liner has a responsibility also to that of the captain of a passenger vessel at sea, and he should have a similar place in the community. His skill and experience must be great. No one should be allowed to remain the notion that boldness and thoughtlessness of the moment are his chief characteristics. We are progressing in the right direction, but progress must continue.

The change can be logically forecasted by the aircraft industry and those vitally interested in its success. Why should a plane manufacturer not advertise the number of new license fliers trained on his plane in a month or year? Or their record of freedom from accident? Or a flying service that a business man had obtained his license after only so many days of training? Or again, a manufacturer that however organizations had used his planes so many hours of business flying a year? These are the things that make the average man feel that he too can fly a plane, and, if he has the financial resources he should purchase one. The situation is after all within reasonable control of the aviation industry itself, for it can all be controlled by the content of the industry's own publicity.

The automobile industry long ago discovered that we don't all have to be Ralph De Palma. This 100,000-mile continuous run made by a stock car on a speedway—who recalls the names of the drivers? The pilot is emphatically entitled to his place in the sun, but he is big enough to appreciate that his industry must come first. The industry is absolutely dependent upon the need of convincing the average man that he, too, can use a plane—his own plane.

THE French AIR-BOAT LINE TO

By CHARLES H. GALE
Assistant Editor of Aviation

FOR ALMOST two years Toulouse, France, and Buenos Aires, Argentina, and intermediate cities have been linked by a fast air-boat service operated under French auspices. The company charged with this operation is known as Compagnie Aéropostale Générale, and the line has commanded the attention of the aeronautical world from the very beginning because of the audacity of the conception behind it, because of the persistence with which it was developed in the face of extreme difficulties, and because of the unequalled record that the company has maintained.

Economic rivalry in international trade has caused at least three nations—France, Germany and the United States—to undertake trunk air mail projects to the key cities of the South American continent. France was the first to start construction of such an airline and the first to begin operation. The fact that it was proposed and authorized in the latter part of 1928 leads additional interest to this pioneering effort. What the French have accomplished and propose to do in the future in South America is particularly pertinent to American aviation just now in the light of similar projects being promoted by the Pan American Airways and the New York, Rio, & Buenos Aires interests.

project the 226-mile line linking Toulouse and Barcelone was extended 913 miles further to Casablanca, Morocco, in northwestern Africa. On June 1, 1925, almost six years later, this line was extended another 1,750 miles to Dakar, Senegal, on the western coast of Africa.

The result of these sections of the proposed airline to Buenos Aires, that between Toulouse and Dakar thus having been completed, then remained the problem of spanning the South Atlantic Ocean to the East Coast



A group of Latécoère type 19 mail planes on the tarmac at the Barcelone airport, the northern terminal of the line.

South America

of South America and connecting an airline along that coast to Buenos Aires. For a time various seemingly insurmountable difficulties made realization of these two sections only a remote possibility. In 1925, however, a solution to the problem presented by the South American interests was found. M. Marcel Bouilloux-Lafont, who had spent about 20 years directing various trading enterprises in South America, met Mr. Lefèvre, because interested in the possibilities of such an airline, and proposed to take part in the scheme. The Compagnie Générale Aéropostale was organized to take over Latécoère Air Lines. Additional major interests available and the whole plan of proceeding the airline was immediately speeded up. In two years the airway from Buenos Aires to Natal on the eastern coast of Brazil had been completed, and on Nov. 15, 1927, the first mail was flown over that airway.

There had been established two of the main sections of the airline. There remained the problem of crossing the South Atlantic between Natal and Dakar. It has been, and still is, the desire of the company to operate flying boats on this section, making the service exclusively by air from start to finish. In view of the impracticability of flying boats, dirigible boats were suggested as an alternative. The French government stepped into the breach with the offer of some obsolete destroyers. These were put in operation as March 1, 1928, completing the French-Brazil-Africa service.

Thus, in less than ten years, the warlike dream of Mr. Latouche, business-like later on by M. Bouilloux-Lafont and his associates, had come into being. That, it was an air-mail service, but fair inter-continent mail service had been established, and works could be served in the communication and transportation of parcels.

In the months since the opening of the complete service, the organization has been making every effort toward refinement, so that the maximum may be obtained in speed and reliability. Besides a high degree of skill



and courage on the part of the pilots and efficiency of mechanics, radio men, etc., as individuals, it was obviously necessary to have an unusually close day-hauling on the part of the mail department due to the long distance.

This is a very extraordinary degree of concentration has been achieved as evidenced by the fact that the length of time required to complete each trip has been lowered from two weeks or more in the beginning to an average of slightly more than a week at the present time. This low elapsed time between Toulouse and Buenos Aires has been achieved in spite of the fact that the pilots fly by night over much dangerous terrain and are without many of the aids which make North American routes particularly safe. Referring to the absence of many airports along the South American route and some parts of the Toulouse-Dakar section, The round trip, the same 7,783-mile trip now stands at 378 hr., 15 min., or 7 days and 9 hr. Of this total of 178 elapsed hours, including all stops, more than 160 hr. were consumed by the dispatch boat getting across the South Atlantic.

Trinidad is considered the start of the South American air line. Here the mail is centralized from various European countries and all parts of France for the South American mail planes. Schedules are arranged so that connections with Paris and Brest are available up to the time of the take off. This section is 2,923 miles long. Up to April 13, 1929, the weekly plane took off every Friday, but beginning on that date the take-off has been each Sunday morning. About a dozen stops are made before reaching Dakar. The mail is rushed steadily

and courage on the part of the pilots and efficiency of mechanics, radio men, etc., as individuals, it was obviously necessary to have an unusually close day-hauling on the part of the mail department due to the long distance.

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forward as rapidly as weather and general operating conditions permit. 24 conditions are reversal the mail routes Dakar about Monday noon, or during the afternoon. Here it is put aboard one of the dispatch boats which immediately speeds westward toward Natal.

In covering this Toulouse-Dakar section it is necessary to fly over the Pyrenees Mountains between Spain and France, across the Straits of Gibraltar and along the Iberian peninsula along the western coast of Africa. At the conclusion of the first year of operations in March 1929, there had been no more than 100 mail trips completed in this section. Of the 100 trips scheduled 102 were completed. Not all of these were completed on schedule, of course, but with the exception of the two mentioned all the others were completed with no cause than slight delays.

The two failures to complete trips were occasioned in both cases by accidents. One attracted world-wide attention because the pilot and radio operator, after having been forced down in country controlled by a hostile tribe, were captured and held prisoners for several months. It was some time before the Company became definitely aware of their fate, and much time was consumed after that in negotiating for the release of the airmen by payment of ransom. The other accident is presumed to have been a forced landing just off the coast on the Casablanca-Dakar leg, as the pilot and plane disappeared without any trace.

According to the official report of the company made in April, October, 1928, the average time required to cover this section has been as follows: South-bound flights going toward Dakar, 66 hr in September, 1928; 44 hr 45 min in March, 1929, and 39 hr in September, 1929. For north-bound flights going toward Toulouse, 78 hr in September of 1928; 20 hr 25 min in March of 1929, and 43 hr 45 min in September, 1929. The record for the trip is 20 hr 15 min. It is the hope of the Company to bring the regular average for this section down to 24 hr. These times include all stops and represent the elapsed time between the take-off and arrival at the two terminals.

On account of the inauspicious country in Northern Africa, it has been the custom of the company to operate a nonstop cargo plane on this section of the route. Since May, operating conditions have been such that the accompanying plane, which used to go to the assistance of the mail plane in case of a forced landing or other difficulty, has been discontinued. This has been brought

about by the improved mechanized efficiency of the flying equipment.

Most of the airports on this section are government installations. The planes used were originally for mail and express only, but the new Lioré & Olivier 28, and eight-passenger cabin machine (described in *AVIATION* for Dec. 7), is being substituted gradually, so that passengers may be accommodated. This plane is a new product of the Lioré & Olivier factory, and inauguration of passenger carrying on the various sections of the air line will coincide with the general introduction of the new equipment.

Quite a different chapter has been written in the development of Natal-Buenos Aires section, because of the complex nature of the project. There was absolutely nothing to start with, and the company, like North American enterprises in Latin America, had to build its own airway and airports, import and install its own equipment, and cope with the various difficulties peculiar to South American terrain and political situations.

The line is 2,850 miles long and extends southward from Natal along the eastern coast of the South American continent, passing at various important points, including Rio de Janeiro, before reaching Buenos Aires. Two subsidiary companies were organized in South America to facilitate the acquisition and installation of airports. Rio de Janeiro has a government airport which the company is to use, and all the others were built by the company.

Although the airports are lighted, there are no beacon lights to guide the planes across those parts of the country covered by night. The radio equipment on each plane is depended upon for weather and whereabouts information, and the pilot's detailed knowledge of the terrain over which he is operating is depended upon for navigation. Every one of the 104 scheduled trips during the first year was completed. Land planes built for mail and express only are used. On this section, however, as on the Toulouse-Dakar section, passenger planes are to be installed as rapidly as they are produced by the factory.

Up to April 13, 1929, the Europe-bound mail left Buenos Aires early Thursday at midnight. Since that date, however, a series every Saturday at midnight and Wednesday to reach Natal by the latter part of the next Monday afternoon when it is transferred to the dispatch boats and shipped eastward to Dakar. This section has been flown on a weekly schedule, but is subject to be operated bi-weekly. The mail for Europe and Africa will be shipped only every 8 weeks. The bi-weekly schedule will offer better service between the cities along the route and is designed to meet competition which is developing from airlines of other nations, particularly the companies representing the United States interests.

According to a recent report of the company the following average times for this section have been made:

For the south-bound mail from March 29 to September, 1929, 24 hr in March, 1929, and 43 hr in

AVIATION

February 8, 1929

September, 1929. For the north-bound mail from Buenos Aires 66 hr in September, 1928; 36 hr in March, 1929, and 45 hr in September, 1929. The record for the north-bound trip is 36 hr and the record for the south-bound trip from Buenos Aires is 35 hr. Both of these were made in 1928. Buenos Aires still is considered the starting point for the European-bound mail, although there is an important connection to Santiago, Chile.

Aeropostale is very strong in South America, having been the pioneer in the inter-continental air mail service idea and leader of its contracts with a number of the important South American countries. These contracts give the company preference for a considerable proportion of mail from Argentina, Uruguay, Chile, Paraguay and Venezuela, which is destined for Europe and Africa. This arrangement is similar to the terms of the contracts which has been awarded to the New York, Rio de Janeiro & Buenos Aires Line, namely, a certain percentage of all mail destined for Europe and Africa is to be sent by Aeropostale (and for the United States to the use of the American company). This includes not only mail definitely posted as air mail, but other classes as well.

THE ECLAIR-NATAL service was the last to go into operation. It is the simplest of the aerial mail up of the two land sections and the completion of the entire route between France and South America. Adoption of dispatch boats made it the most simple of the three sections to put in commission but it has been the most difficult from the strictly aeronautical point of view. The surface craft have given rather unsatisfactory service. Operations is expensive and the machinery is delicate, involving large crews. At the present time, there are four large, four-motor boats, two oil tankers and two water tankers used to maintain this cross-sea service. To improve the service the Company has ordered four new seafarers for delivery next summer. These are to be equipped with 1,320 hp. Diesel engines and, besides having a speed of 15½ knots will enable a saving of about \$300,000 in operating costs.

The company is still striving toward the development of a flying boat type which will be practicable for this section. When such machines actually go into operation these four new dispatch boats will be used to go to the aid of the aeronautic in difficulty or for transferring the mail across the ocean when prolonged storms interrupt the boat schedule. Early trials of the flying boat in France are not expected by the company. Every three days the line is extended further to receive the mail.

For the time being, however, the present methods, however, it is understood that Lioré & Olivier is giving special attention to this in his factory and that two large flying boats, one of two engines and the other of four engines, are under construction. The Rohrbach Ro 110 bought from the German company by the French government was acquired with this South American line particularly in mind. It is said by the New York representative of



The new Lioré & Olivier cabin passenger and mail plane, designated as type 28

the company that it is possible that one of the new Lioré & Olivier 28 machines fitted with passengers might be placed on the quasi-coastal line if the results of competition required such drastic action before the flying boat had been developed.

It is interesting to recall that up to recently, the German government for a similar route to South America subsidized maintenance of flying boats to the extent of \$1,000,000 for very certain of the services. Following the failure of the Ro 110 type to come up to Luft Hansa's expectations it was decided to adopt temporarily the French method of using dispatch boats. The German service has not been founded yet. The chief problem is this European-South America service, it will be seen, is the transformation of the six-hour service into a strictly air service.

The boats ply between Natal and Dakar by way of the Cape Verde Islands and the Island of Fernando de Noronha. In the latter two locations and at St. Louis (north of Dakar on the west African coast) and at Natal, seaplane stations have been built in anticipation of the flying-boat service.

The average time required to make the 2,024 miles of this section is about 4½ days. This means that the time required for the flying boats is longer than the entire trip from Toulouse to Buenos Aires in flying across the ocean. The record for the flying boat is 163 hr, based on the sixteenth trip in 1928. The average time is between 108 and 115 hr. Since the record for the entire flying trip between Toulouse and Buenos Aires stands at 157 hr, 15 sec, it is understood really why the company is so anxious to solve the problem of flying the Natal-Dakar section. Greater speed on the two land sections depends directly on the development of faster aircraft, aids to navigation, etc. but a tremendous advance will be achieved by the substitution of flying boats on the third section.

In South America the most important branch line is the extension of the Natal-Buenos Aires line 705 mi west from the latter city to Santiago, Chile, with a stop at Montevideo to western Argentina. Since this trip requires 10½ hours, the mail from Toulouse may reach the Pacific Ocean in less than eight days. Planes on this stream must cross the Andes at an altitude of about 23,000 ft. and with temperatures far below zero in the winter season. In spite of these hazards and difficulties, the route is considered very worth while, especially in that it enables mail to reach Chile from France in about one-third the time required by surface transport.



The Ro 110, one of the six dispatch boats now being used to carry the mail between Dakar and Natal. This type will be replaced by better, more modern craft this summer.

Two other lines are operated in South America—both by subsidiaries. A line connecting Buenos Aires and Asuncion, capital of Paraguay, is operated by one subsidiary and a line from Buenos Aires and Bahia Blanca to Comodoro Rivadavia, in the southern part of Argentina, is operated by the other. This latter includes an air-mail service, planes being operated between Bahia Blanca and Comodoro Rivadavia, and trains between Bahia Blanca and Tucuman.

Estimates of the Company's lines north from Neal to points in French Guinea, Venezuela and the West Indies is under serious consideration. Survey flights have been completed, contracts required for airports and permanent bases by the various countries involved to be secured before the line is opened. Operation of this line would permit mail to reach Venezuela and the West Indies from Europe in eight days. Study progress in the promotion of this new line is planned in strict that the company may be the first to secure the advantage in economic relations the line would afford.

ON THE OTHER SIDE of the ocean the company operates the following airways: Drava to Algeria, France to Morocco, France to French Western Africa, and France to Spain. It has in the process of organization the very important trade routes linking Paris, Maracaibo, Curaçao, Colombia, Elizabethville, Niger and Mombasa. This line, 7,490 miles long, is being developed by the Compagnie Trans-Atlantique d'Aviation, which was organized by Compagnie Générale Aéropostale. The French Government owns one-half of the company and the remaining one-third. One-half of the Belgian Congo airways development has been carried out jointly by the French and Belgian interests and it is understood that operation will be started also, alternate stops between the European and Congo terminals being made by French and Belgian planes.

It is interesting to note that the company's seaplane service between Maracaibo and Algecira is based upon a good deal of general "school" on water flying in anticipation of the eventual flights over the Atlantic.

The flying equipment of an airline has a great deal to do with the efficiency of that line of course. In the Aéropostale service, the Latécoère 23 and the Latécoère 26, the former a cabin monoplane powered with a 590-hp Renault, and the latter an open cockpit monoplane powered with the same engine, are both popular. The company also has a great many Breguetts, but there are probably more Latécoère 23s in the Latécoère 26s in the class. The company also has some Latécoère 32 flying boats, and C.A.M.S. and Lioré-et-Olivier flying boats. On Dec. 31, 1937, the flying equipment of the company was distributed as follows: In Europe and Africa 34 Latécoère machines, 57 Breguetts, and one each of the Farman 70, Potez 12, and Morane 105, types. In South America there were 40 Latécoère machines, and 34 Breguetts. Of course the machines located in Europe and Africa are operated on lines other than the trans-Atlantic service. This company also uses 14 flying boats. The gross total of land and sea-planes on the above date was 178.

At the same accounting, the company had 1,227 water-cooled and 816 piston air-cooled engines, a total of 1,946. Only 155 of the number were rated at 400 hp or over. Renaults and Lorraine-Dietrichs are the main make and equipment.

At the outset of the six-boat mail service, an average of fifteen days were required to complete the air trip

from Europe to South America. This was steadily reduced to eight days. The northbound trip in the early months required something like seventeen days to complete, and that too has been reduced steadily. It should be mentioned that mail takes about a day longer going to Europe than in the opposite direction. This is because of prevailing winds and ocean currents in favor of the South America-bound traffic. There is a 4½-hour difference between time in Buenos Aires and Toulouse to be reckoned with also.

In 1928 the company's planes flew 1,650,355 mi. on all its routes. On the Neal-Buenos Aires route alone 210,062 mi. were flown. In 1939, the year of the company's origin, a total of only 142,967 mi. were flown in spite of more traffic. This was increased to 244,614 the next year, and by 1933 the figure had passed the 1,000,000-mile mark, going to 1,031,650 mi. There has been a steady growth every year.

It is obvious the routes operated by Aéropostale require flying over some rather difficult terrain and the excellent operations record which prevails in all the routes is creditable on that account. Up to Sept. 30, 1937, 1,438,030 mi. had been flown in that year and it is expected the figure for the entire year would be more than 2,000,000 mi., as compared with the 1,650,355 mi. for 1928, which in turn was 17.8 per cent larger than 1927. This mileage includes 926 trips over the Pyrenean Mountains between Spain and France, 624 trips over the Sierra Nevada in Spain and Straits of Gibraltar, 624 trips over the Mediterranean Sea and 304 trips over the Desert of Mauretania in northwestern Africa, the Andes and across the Brazilian jungles.

AT THE close of the year there were in the employ of the company 300 airport engineers, 80 pilots, 30 chief mechanics, 210 mechanics, 53 radio operators, 25 electricians, 30 commercial agents, 57 clerks, 50 general offices, 200 stokers and crew, and 600 various specialists



Latécoère 26 on the line to Maracaibo. Note floatation gear under lower wings.

This represents a total of 1,415. Of course these people were employed as all the lines of the company and not exclusively the France-South America line in which we have been chiefly concerned in this article.

A new agreement with the French government was signed on August 2, 1937, and was to become effective as soon as the necessary law had been voted. This agreement effected the sphere of operations of the company and also the nature of term of subsidy and the general financial structure. The company is to have exclusive operation rights in the south of France, west of and including the Massif Central-Alpes line, everything in South America south of the Tropic of Cancer and in Africa everything west of a line linking Algiers and Lake Chad (in the northeastern corner of Nigeria, north Central Africa). This concession has been extended to a period of 20 years with reciprocal liberty of cancellation after the first 10 years. The company has an option to renew the concession under equal conditions at the date of expiration.

The original capital of \$1,370,000 is to be raised to \$2,542,000 and the French government will receive \$385,000 in shares in return for the concessions granted. Thirty per cent of the capitalization will consist of A shares having five votes each and 70 per cent of B shares which carry a rate of one vote per every 20 shares. It has been provided that the company may with the approval of the French government issue bonds guaranteed by the government up to five times the share capital. A bond of \$30,000 is to be deposited by the Company with the government.

One of the Company's most valuable assets lies in the special agreements and contracts it holds with various governments in Europe and South America. These effect mail and express and operating rights enjoyed by the Company. Most of the European countries now agree to mail and certain amounts of the mail to South America via the Company's line. The line also to the advantage of this service in Spain and Italy. The arrangements with the South American countries mentioned above, amount to even more.

One thing about Aéropostale quite contrary to the practice of American air transport companies is the availability of a detailed account of its financial condi-

tions and all phases of its operations. This probably is accounted for by the fact that the Company is subsidized by the government and therefore does not have to be so open to the public, whereas in this country all the air transport lines are private with only indirect and as the manager of air mail contracts, etc. Inasmuch as the financial structure of any organization is what might be termed as its blood, a knowledge of conditions is extremely valuable to both the expert and the layman alike.

All of the figures quoted here were contained in the report made to the directors of the Company at the Paris meeting on Oct. 19, 1937. Maracaibo is the destination of the France-South America line, in which we find that the income per trip from South America to Europe on Jan. 1, 1937, was \$2,700, and on August 9 that this income per trip has reached to \$2,200. The increase is said to be the same on the reverse journey from France to South America.

Expanding this income report from the individual trip to the total income yielded by the entire line by each quarter, we have: In 2,228 second quarter, \$4,426; third quarter, \$32,581; fourth quarter, \$37,994; a total of \$34,601. In 1929, first quarter, \$48,634; second quarter, \$86,017; third quarter, \$119,312; a total of \$233,944.

In recent years there have been three issues of bonds to back up losses needed for expansion and organization purposes. There was an issue of \$2,000,000 in bonds of \$50 each in 1927, an issue of the same amount in bonds of \$40 each in 1928 and the increase in share capital is \$250, already referred to.

A loss in operation is expected by the Company for at least the first part of 1938. The loss of the Dakar-Natal-Macao Airline segment of the France-South America airline. These two portions of the line are mentioned because the first year of this airline was completed within the scope of this report, the Toussaint-Louverture section having been opened much earlier. The loss for the first year was \$600,000.

The Company's balance sheet and profit and loss account as reported in October, 1937, is shown in Table I. Stimulation of economic relations and development of communications are the motivating focus behind the Aéropostale activities at the present time. German and United States interests have recognized the value of aviation for the same reason and have sought to realize the advantages of such air services in South America. Indeed the United States projects stand a vast amount of capital, a resource which gives the American concerns a decided advantage. Aéropostale looks with this, however, with alarm, for it is in the conviction that the number of experience it has derived in the operation of the line to South America is a more valuable asset. It furnishes considerable rivalry in the field sooner or later but is confident of its position in the ultimate picture.

Valise-Balise (Balise) per trip (Ex. 1937)

	1937	2048
Passenger service at the rate of \$10 per head		
Adults	112	244
Cabin and berths	11,124,460	11,124,460
Operating expenses, wages	143,400.00	117,000.00
Operating expenses, salaries	100,000.00	100,000.00
Leasing field, fieldhouse equipment	69,171.44	1,000,311.36
Administrative and supplies	26,030.36	99,911.12
Administrative expenses	1,000.00	1,000.00
Flight division	1,093,341.40	1,191,271.40
	\$1,010,329.99	\$1,171,289.31
Adults		
Cabin and berths	1,000,000.00	1,000,000.00
Operating expenses, wages	2,000,000.00	2,000,000.00
Operating expenses, salaries	1,000,000.00	1,000,000.00
Leasing for depreciation	11,050,010.14	11,161,987.12
Flight and supplies	2,000,000.00	2,000,000.00
Administrative expenses	100,000.00	100,000.00
Flight division	100,000.00	100,000.00
	\$1,010,329.99	\$1,171,289.31
Passenger and cargo		
Adults	1,000	1,000
Operating expenses	21,010,357.34	20,015,125.94
Leasing field and capital expenses	230,405.00	269,500.00
Administrative and supplies	100,000.00	100,000.00
Flight division	100,000.00	100,000.00
	\$1,010,329.99	\$1,171,289.31
Adults		
Operating expenses	41,010,357.34	38,210,909.28
Leasing field	579,434.00	593,303.36
Administrative expenses	79,175.00	56,000.44
Flight division	50,000.00	20,000.00
	\$1,010,329.99	\$1,171,289.31

SURVEYING THE

Airport Problem in NEW YORK CITY

By JOHN C. HOLME, JR.

The Last of Three Articles on a Problem Typical of Most Great Cities

IN SOPAR, as it is possible, the use of seaplane or flying boats for passenger service to and from New York City is more logical than the use of landplanes, since numerous areas of quiet water suitable for take-offs and landings are to be found within a few minutes' distance from the center of Manhattan. At present, however, only two such services are open to development for transoceanic service. Other suitable locations have been carefully considered by the committee making the plan which were discussed in the first article [issue of Jan. 11], and by other agencies. The two areas now in use may both be reached from Times Square in 15 minutes, making them closer than any existing airports, and four proposals for additional seaplane facilities are now under consideration. There are also three seaplane anchorages at a greater distance than the 15-minute radius from the business district.

From Times Square in 15 minutes, making them closer than any existing airports, and four proposals for additional seaplane facilities are now under consideration. There are also three seaplane anchorages at a greater distance than the 15-minute radius from the business district.

The North Beach site of New York Air Terminal, Inc., is at present much more readily accessible than is any other landing field or seaplane harbor. Located on Long Island Sound near Hell Gate, it is only three miles air-line from Times Square and is at a distance of only nine miles by road. A company boat made the trip from 42nd Street and East River in 24 minutes. An additional 15-minute taxi ride from Times Square makes the total 39 minutes. Via 59th Street Bridge and Queens Plaza, the driving time is 35 minutes, the route being marked by arrows. The port is also accessible by the Flushing L.T.T. train to 24th Street and Broadway, a

25-minute trip, plus a 35-minute taxi ride to the Beach, making the total traveling time 37 minutes.

This port is used by Corpus-Wright Flying Service for charter and tour work, New York and Southern Air Lines for charter work. The equipment at the port includes one hangar, a dock, mill, three speed boats and a club hotel. The flying equipment includes Ireland and Sikorsky air yachts, Savoia-Marchetti flying boats, and Parnall seaplanes. The boat house and veranda of the club hotel give the port a yacht club atmosphere. There is adequate unobstructed take-off in Bowery Bay in any direction, and the area is lighted at night. This water area is ideal for seaplane landings and take-offs, as it is unobstructed either by river traffic, drift-wood or physical obstructions on the nearby shores. A 200-acre water park new under construction adjacent to the dock will afford seaplane facilities within a year.



A photograph of New York City from the air.

Arthur G. Johnson

A addition to the downtown Manhattan, Wall Street and Brooklyn area has been proposed by Atlantic Coast Airways whose flying boats are not by a company base from pier A of the Battery in a 10-minute run, pier A being 15 minutes by subway from Times Square. The total trip from Times Square is 30 minutes, from Wall Street, 35 minutes. To date aviation interests regret the rejection of proposals for leasing space for a seaplane ramp or dock without larger air way on the islands in New York harbor. Atlantic Coast Airways has solved this problem of the need of seaplane facilities in the harbor by leasing 250 feet of waterfront property from the Jersey Central Railroad in Jersey City, on which site they will build a ramp and seaplane cradle. The take-off area is free from the deadlocked traffic, and airplane take-offs and landings are other seaplane landing or take-off space in the East or Hudson Rivers. The shallow water in this area makes it both impossible for harbor craft to maneuver in the take-off area and to add on makes take-off easier and faster. The Western Bargee reports that there is an average of ten days per year of dense fog at the Battery.

THIS is a proposed development of seaplane facilities at Port Newark Municipal Airport. It has been suggested that some seaplane facilities adjacent to the downtown harbor area be used for serving and storing seaplanes, using only the harbor water for picking up passengers. The Newark airport is 45 minutes from Times Square via the Holland Tunnel and Elmhurst Highway extension, and 30 minutes from downtown New York over the same route. Another solution to the seaplane facility problem will be offered by the expansion of the Savoia-Marchetti Air Terminal's seaplane base. Here also will be sufficient area for construction of adequate service facilities and hangars. As mentioned in the description of the Savoia airport [issue of Jan. 25], this site is 10 minutes by Holland Tunnel and Old County Road from Times Square, being only 7 minutes from the Canal Street end of the Holland Tunnel in downtown New York.

The proposed Jersey City airport at Draper's Point, N. J., on Newark Bay, will also offer seaplane accommodations when completed. This site is 30 minutes from Times Square via the Holland Tunnel and Hudson Boulevard, or 35 minutes from the Canal Street end of the Hudson Tunnel.

The American Aeromarine Corporation, manufacturer



Courtesy of American Aeromarine

of Savoia-Marchetti flying boats and amphibians, will develop New York Seaplane Airport at Port Washington, L. I., Massapequa Bay of Long Island Sound, 15½ miles by air from Times Square. This site was 20 minutes by automobile via 9th Street, leading to Queens Plaza, North End Boulevard to Port Washington, and the airbase, with company signs indicating the name Long Island Railroad station, running over 40 minutes make the trip to Port Washington in 45 minutes with an additional 5-minute taxi ride to the field, bringing the actual traveling time up to little over one hour. This site is already in use for the Savoia-Marchetti factory on Massapequa Rd., but a six-months extension of the present site to include hangar service and school accommodations is planned. Floating docks and passenger accommodations are included in the proposed complete seaplane airport to be completed within a year. Although this location is too distant from the metropolitan district to be used for passenger service, it can be used as a seaplane base and it is intended to be used for a seaplane club. It is located in Massapequa Bay is appropriate for this purpose. Manhattan Harbor is too rough in certain directions for seaplane landings and take-offs, but there is an abundance of boats and yachts in the bay which at times would make it necessary to land or take-off outside of the bay after a fast run from the Manhattan Island floating dock. The Floyd Bennett Municipal Airport, Brooklyn, 65 minutes from Times Square by bus or subway, also has proposed seaplane docks and accommodations which will take this location another desirable sight for a seaplane operating base. This plan of having as outlying hangar for service and repair of flying boats and seaplanes has worked out efficiently in this instance. The New York City Airport, Inc., development on Flushing Bay will also provide seaplane facilities. On this site an aeroshell park, suggested by Ben Williams P. McCracken, is included in the proposed development. Other seaplane anchorages existing now for seaplane landings and take-offs, but without service or hangar facilities, are located

at Rye, Westport, Glen Island, and Seagate (Brooklyn), N. Y. However, all of these sites are beyond the 30-mile radius range from the business districts of Manhattan.

THE Keweenaw-Lakeview sulphuric factory uses the East River adjacent to their East 26th Street factory for landing and take-off of factory shipments. This site has been proposed for the development of a passenger terminal but has been rejected because of physical disadvantages. Pilots who have used this site say it is undesirable for the landing and taking off of a fully loaded transport plane because of delayed, river traffic and physical obstructions on a cross river take-off. It is reported that the city is willing to finance and push development as well as the 145th Street Hudson River development of seaplane facilities, awaiting the endorsement of the aviation industry associations.

The development of the 72nd Street and Hudson River site has been proposed by the Roman Catholic Archdiocese, the Fair Avenue Baptist Church and Columbia University, but on this instance as well as in other cases lack of establishment of such bases has been due to lack of concerted action on the part of aviation officials. It seems a case of individuals being defeated by larger so-called public interests. When it is realized that the air-mindedness of New Yorkers demands the establishment of adequate seaplane facilities, this question will become a public problem and as such will have considerable additional support. As to the possibility of polarizing proposed airplane sites for development, and arresting interairline river traffic, it has been the experience of yacht clubs and commercial interests to have failed in such attempts. However, if aviation seaplane bases for the New York metropolitan district become a public issue, it is no doubt highly probable that some of these interests will be brought in.

The most outstanding request is the Fast-Flying Committee report which states that five bases are in the central part of the city about seven days a year. This is less than the report of 24 days a year done for the Battery area, making upplane locations more desirable from the meteorological point of view. However, river traffic, tall apartment houses on the New York side and the Palisades on the New Jersey side, make approaches or cross river take-offs and landing hazardous. The city of New York (Board of Estimate and Appointments)



Aerial photograph of the site of the Seacraft Airport on the banks of the Haverstraw Bay, N.Y.

COMBATING Corrosion

OF AIRCRAFT

Metal Parts

By J. E. SULLIVAN

*Byers of Aeromarine
Navy Department*

THE IMPORTANCE of properly protecting the various parts of an airplane, particularly the metal parts, cannot be too strongly emphasized. Metal, especially in the gauges and in the construction of aircraft, will corrode rapidly if not suitably protected from deteriorating substances. These harmful influences are obviously more easily at work in salt-laden atmospheres than in inland sections but they are always present and too much care cannot be taken to combat them.

The cause and prevention of corrosion of metal aircraft parts with all of its serious economic results has become a matter of prime importance. The progress of corrosion can only be prevented by the use of a perfect insulating layer between the metal and corroding elements. A completely impervious protective coating is undoubtedly the most effective and not in shadow terms of protection, economy and not in shadow terms of protection and durability.

Unfortunately many manufacturers fail to appreciate the necessity of employing satisfactory protective coatings on aircraft and in some instances when the necessity of this protection is recognized, the best known practices do not always correctly apply. Very often it is a case of lack of knowledge.

At one time a manufacturer of aircraft was as far behind in production and delivery that his only aim was to turn out airplanes and in his haste—a natural consequence of such a condition—very little attention was accorded to the matter of protective coatings. Two coats of a fairly good looking finish were applied to the



Decades after showing scale or corrosion on the surface.

"Save the Surface and you Save All" may not always be true as applied to airplanes, but it is a matter of great importance, and one which has often been overlooked. Particularly is it important as regards possible corrosion of metal parts, in places which are not easily accessible either to inspection or repair. Mr. Sullivan offers herewith a detailed discussion of preparing metal surfaces, proper coating, inspection and maintenance to insure adequate protection against possible structural failure due to corrosion.

structure, the greater part of which was steel, but apparently no care was used in applying the coatings nor was any effort made to ascertain whether the finish was satisfactory. A number of these planes, destined to operate near the sea coast, were in such poor condition after four months' service that they required a major overhaul. Two of these planes, after one hundred and fifty flying hours, were considered so seriously defective from corrosion and structural weakness that it was necessary to decommission them and relegated them to the scrap heap.

A CORRODED PART in an airplane is something to be avoided, particularly a structural part. It not only tends to shorten the life of the plane and makes the removal of the part necessary, but it is possible that it will fail at a critical moment and result not only in the destruction of the plane but in serious injury to the occupants. Such parts are undoubtedly a constant source of danger and although periodic inspection of a plane may often reveal corrosion in susceptible parts, the chief source of

danger lies in the inaccessible locations where the actions of waves have unnoticed structural failure which is quite efficiently accelerated by whatever stresses in the offshore result.

To carry investigations of failures of corroded aircraft parts, it has not been deemed possible to definitely determine the cause of the deterioration. It would have been assigned to a number of causes, any one of which it would have been reasonable to assume was the true cause: such as improper selection of material, or incorrect manufacturing practices, for example, improper heat treatment. In the majority of cases, however, it would have been just as reasonable to assume that the parts had not received proper surface protection. While this may not have been the chief cause for their unsatisfactory condition, it was perhaps a contributing factor.

Reasonably effective protection can be obtained, regardless of the type of service to which the plane is to be subjected. This can be accomplished only by strict adherence to four fundamental principles. The disregard of even one will in all probability be conducive to a poor job. The requisite principles are as follows:

- (1) Proper preparation of the surfaces to obtain good adherence of the paint.
- (2) Selection of good quality finishing materials.
- (3) Thorough drying between coats.
- (4) Frequent inspection and maintenance of protective coatings.

Experience has shown that to obtain good paint adherence it is necessary that the surfaces be thoroughly clean at the time the initial coat of finish is applied. This may be accomplished in many ways, depending upon the material to be cleaned. Through the needs used at present in the construction of aircraft no steel and aluminum alloy the conclusion will be confined to these two materials.

In practice, of the two, except painting should be considered later. When an aluminum part is cleaned there is always the possibility that the plating solution may lodge inside the tubes and otherwise be responsible for corrosion of these parts. The coating should be uniform in thickness and of such a quality as will withstand at least a one hundredweight, twenty-five-ounce salt spray test without any signs of rust appearing. Immediately after plating, the parts should be given a coat of primer, especially if they are not to be used for any length of time. For the best results, implied parts should be entirely cleaned down to bare metal before the initial finish is applied. Cleaning of such parts may be accomplished by numerous methods, but regardless of the process it is essential that it be one that will not injure the material.

Pickling and sandblasting are recommended methods. Since the latter methods of cleaning are incomplete, pickling can be more advantageously used. However, there can be disadvantages. In picking either the heat can reveal sulphuric or muriatic acid may be used. When sulphuric acid is used the bath should contain either five to ten per cent by weight of concentrated acid or seven and one-half to fifteen per cent by weight of 66 per cent commercial acid. The heat results with muriatic acid and are obtained from a bath containing twenty-five per cent concentrated acid by weight.

A recommended pickling procedure is as follows:

- (a) Immerses in bath heated to about 140 deg. to 150 deg. F. for a sufficient length of time to effect

removal of the oxide or scale. The length of time varies. However, ten minutes should suffice.

- (b) Drains all acid from the parts and rinses in cold water.
- (c) Rinses in a bath for about five minutes, drains, and then rinses in clean but water. The bath may consist of approximately twenty pounds of either quicklime or slaked lime per one hundred gallons of water. The bath ought not to be heated.

For exterior surfaces, low pressure sandblasting is considered more highly efficient. Many manufacturers of steel fuselages sandblast the completed fuselages following this by a blast of air in order to remove any



Box-type fuselage with holes to permit inspection of bare surfaces.

loose material resulting from the sandblasting. A coat of primer is immediately applied thereafter.

For aluminum alloys the anodic oxidation process has reportedly demonstrated its superiority in all other surface preparations. This process not only cleans the surfaces thoroughly but it forms an unusually good base for the protective coatings. In itself it is not a satisfactory protective coating, but there is absolutely no question as to its value as a base for further finishes. The Bureau of Aeronautics, Navy Department, as a result of extensive laboratory and service tests of various paints has concluded that an anodic treatment is superior to any present method and provides an all round protection to the use of aluminum alloys.

The majority of the responsible aircraft manufacturers in this country who employ aluminum alloy to any extent are equipped for this process. The treatment consists of immersing the part in a chrome and solution through which an electric current is directed, the part under treatment being the anode. The film produced is extremely thin and adheres so firmly to the metal that it could be considered a part of it. The process removes the polished surface characteristic of aluminum and its

alloys and imparts a light gray surface appearance to the material.

Coatings such as carbon, vermiculite and bauxite and several cleaving compounds based on magnesium phosphate may be used but are not recommended, unless the use of the anodic treatment is impracticable. When a solvent is used, thoroughly rinse the cleaned parts in hot water to insure complete removal of the solvent from the surfaces, as its presence adversely affects the adherence of the paint.

Regardless of the method of cleaning, apply a coat of the initial finish as soon as the parts have been cleaned, otherwise these parts may react in contact with gray or oily hands or other objects which would vitiate the advantages gained by cleaning.

There are a variety of so-called "Aircraft Finishes" commercially available. Practically every paint and varnish concern of any size carries that the paint and varnish industry is no longer in its infancy; that it has to live with the older and well-established concerns, and that it must take its place in the aircraft industry. As a consequence, each has its line of "Sales" materials. Most of these concern will supply any airplane manufacturer with exactly what he requires. So unfortunately some manufacturers are not aware of their needs. Such a condition is not in service to the financial benefit of the paint producer but it is, on the other hand, beneficial to the aircraft manufacturer or purchaser. Conditions, however, are improving gradually and aircraft manufacturers are beginning to realize the advantages of purchasing materials concurring to their own specifications determined by experience to be the most suitable for the purpose intended.

In the selection of a finishing material its potential protective qualities should be the guiding factor and not the desire for a quick drying material or a highly polished surface.

On steel parts an iron oxide-ericthrite base compound has been found to be excellent for a priming coat. Such a primer is not expensive and a number of good preparations of this type are readily available. Coated below is a formula for a primer which has proven satisfactory under hard service.

Zinc chromate	31.5 percent by weight
Iron oxide (Fe ₂ O ₃)	15 per cent by weight
Silica	19.5 per cent by weight
Gum	6.5 per cent by weight
Lard oil	15 per cent by weight
Muskrat oil	22.5 per cent by weight

A properly applied finish coat should dry hard and should be flexible, durable, non-flammable, and resistant to oil, gasoline and sea water. A paint which will meet these requirements is suitable as a protective coating for aircraft parts.

The Navy Department has obtained excellent results with a gray enamel. This enamel consists of between twenty-five and forty per cent pigment by weight. The pigment of this finish is basic barium white lead paint

with carbon black in a dark grey shade. The remainder is high grade spar varnish as a vehicle.

Standard procedure on most parts of Naval Aircraft calls for oxidation plating followed by one coat of iron oxide primer and two coats of gray enamel. Carbonate appears to give better protection and is generally more durable than other types of metallic coatings. Further, the process of application is comparatively simple and the required equipment is not as complicated or as expensive as others.

Larded oil is recommended as a coating for the fuselages of closed fuselage members, the oil usually being forced under pressure into the expanded fuselage. When each member has been thoroughly penetrated by the oil it is secured by means of small holes drilled at various locations in the structure. The holes may be sealed by means of cadmium plated drive screws. To coat the interior surfaces of tubing in this manner each member of the fuselage must be disassembled with its adjoining members so that the complete coating of the oil (varnish) the entire member will be secured. Some manufacturers treat each tube individually, beginning with the one hole at the bottom and at areas out of another hole generated at its uppermost extremity and then driving others; however the completed fuselage in a bath of larded oil after the holes have been drilled in each of the members.

One of the pioneer airplane manufacturers in the country, has developed, in cooperation with the Navy Department and the Aluminum Company of America, a process for protecting aluminum which at present stands alone and unexcelled. [The writer is here dealing only with protective coatings added on the surface, and in presently excluding Alodine from consideration—Ed.]. This company makes all aluminum parts as described previously and follows this treatment with two coats of aluminum pigmented aluminum paint. Two pounds of No. 1000 polished aluminum powder per gallon of lacquer-like paint has been found to be the best mixture. The paint, like all aluminum paints, should be mixed for immediate use only. Aluminum lacquered paint has two disadvantages; it cannot be satisfactorily employed in places exposed to the sun, as the sun softens it, nor can it be used where it might come in contact with gasoline as gasoline dissolves it. In such places a combination consisting of iron oxide primer and two coats of enamel should be used. The latter finish is not entirely satisfactory but is as good as any known. A finish consisting of two coats of aluminum shellac has been used by some manufacturers with much success on parts a subject to gasoline fumes. Shellac, however, is not a desirable finish for



Reconditioned fuselage recovered during a flight inspection flight.

surfaces which may be immersed in or sprayed with ink wash.

If metal or wood parts are to touch fabric which is to be dipped, it is necessary that protection be taken to prevent direct contact of the fiber and the regular finishes applied to the metal or wood. If such protection are not taken the dip will act as a solvent and break down the finish, thereby destroying the protective value. It has recently been discovered that aluminum foil is of great value in such places because of its superior dielectric qualities. Aluminum foil 0004

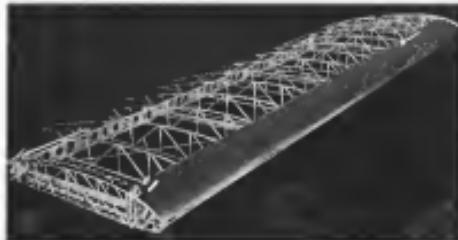
as, think has been found to be most efficient for this purpose. The most satisfactory results have been obtained by coating the members with glue and then applying the foil in small sections by means of a roller. It is necessary to spend much time in endeavoring to apply the foil free of wrinkles as they will not affect the exterior appearance or durability of the glaze. While the application of aluminum foil may take slightly longer than the time required to apply many less efficient materials, the results obtained will more than compensate for the time involved.

Another relatively very highly desirable characteristic of aluminum foil is that it not only protects dope from coming in contact with metal parts but also provides excellent protection against corrosion to the surfaces it covers.

The following other parts of a number of Navy bombing planes after five months of the worst kind of service were found to be in perfect condition in spite of the fact that very little maintenance was given them during that time. The protective coating, which consisted of two coats of aluminum aluminum paint was in unusually good condition, particularly on the surfaces which came in contact with the fabric. These surfaces were further protected with aluminum foil. It was found in some instances that the foil had almost completely deteriorated but in no case had the finish on the metal parts been affected.

Of the four points, thorough drying between coats perhaps needs the least explanation. It does not, however, follow that this is the least important. Such is not the case. We set out rules to mind regarding this particular factor as the numerous elements involved, such as temperature and humidity of the finishing room and length of time after application of the finish, etc., vary. Little experience is necessary to determine when a coat of paint is thoroughly dry—the prime factor is to be certain that it is absolutely dry before the succeeding coat is applied.

Finally care and regular inspection, together with whatever maintenance may be necessary is the most positive insurance against corrosion. The structure should be frequently examined for possible deterioration of the protective coatings and for evidence of corrosion. When the coating is broken or corrosion is in evidence the areas so affected should be given a light wire brush-



Tree of aluminum wire structure underneath meshing protection

ing and the finish replaced. Paint remover may be used to remove deteriorated coatings but it must be applied with caution otherwise it will gain access to the joints and thus destroy the protection originally applied to the flying surfaces.

In connection with the general subject of protection of metal parts against corrosion, there are listed below several valuable suggestions which, combined with those previously discussed, will be conducive of reducing to a minimum the evils of corrosion.

- (1) Thorough clean and dry all surface prior to the application of protective coatings. The verbal specified finish cost should be applied as soon as practicable after the parts have been cleaned.
- (2) Paint all flying surfaces before assembly.
- (3) Paint the frame when practicable.
- (4) Control cables should not be painted but coated with a mixture of white lead and tallow. The proportion by weight is 50-50.
- (5) The use of lacquer as a protective coating on aircraft parts, particularly fabric and metal surfaces is not recommended. Better protection can be obtained by the use of more durable coatings.
- (6) Avoid contact of wood and metal. Wood, is one of its hygroscopic nature rotates moisture when it becomes wet and if in contact with metal will ultimately cause corrosion of the metal. If these materials must be used, isolate by coating the flying surfaces of both the metal and the wood with marine glue or whatever paint and thinner are used.
- (7) Avoid contact of dissimilar metals.
- (8) Apply an anti-tarnish compound made up by weight of 50 per cent petroleum and 50 per cent zinc dust to threaded parts.
- (9) Always use corrosion-resisting metals where possible.
- (10) In employing heat-treated aluminum, quench the material in cold water. Quenching in this manner gives the metal greater corrosion resistance qualities than can be obtained if a hot water or air quench is used.

REGULATING

Air Commerce

ARTICLE III—LICENSING

By JESSE W. LANKFORD
Chief, Registration Section, Aeronautics Branch
Department of Commerce



MUCH CONFUSION has existed throughout the country as to the qualifications and correct procedure for obtaining the various classes of licenses for aircraft and aircraft. Also, many applicants wonder at the increasing excessive delay in receiving their licenses after the completion of their tests.

A good portion of this uncertainty has undoubtedly been due to the numerous changes made in forms and licensing procedure by the Aeronautics Branch in its own efforts to keep pace with the rapid growth of the whole reorganized industry. It must be remembered that the Aeronautics Branch was created practically overnight, and of necessity began operation with an untrained personnel and without a precedent for guidance. Forms and procedure for obtaining licenses had to be outlined from theory, and remained to be tried.

The limited personnel soon found itself buried under an avalanche of applications and conditions soon became more chaotic by an influx of letters, telegrams and long distance phone calls from partly ignorant applicants. The aeronautics branch, however, did not let the volume of either exceedance cause怠慢. Constructive changes in both forms and procedure were gradually implemented and a system has been developed which meets present conditions with an absolute minimum of red tape and furnishes the quickest possible licensing service to the applicant.

Letters are now issued within one week of receipt of the approved examination or inspection report. This time could easily be reduced 50 per cent were it not for the vast number of incomplete and incorrect applications received. The forms themselves have been reduced to interpret only pertinent facts. They include sufficient explanation, which, if read, would enable the applicant to complete the forms correctly. Failure to answer a single question makes the application incomplete for essential records and necessitates correspondence or return of the application. Also, many applicants are not educated for classes of licenses for which the pilot, mechanic or aircraft is obviously ineligible.

There is nothing the Washington Office can do

but to advise the applicant to correct his application. There is a note on both the pilot's and mechanic's forms which calls attention to the necessity of two identical pictures of the applicant, showing front and side view. "Gradually, by the word 'gradually' was the point of emphasis, however, the pictures required to be clearly 'head and shoulders only,' the applicant having removed all clothing for the pose. It is a revelation to see just what can be gotten on a photograph just $\frac{1}{2}$ by $\frac{1}{2}$ inches in size. They range from undramati-

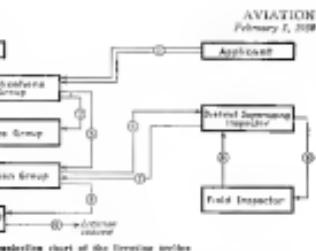
in such cases. The classes are that the inspector has not even had time to correct the pictures. Thus when the papers are corrected, they must be mailed to the Washington office.

IF ANY APPLICANTS have really taken the instructions on the application letter seriously, there is a note on both the pilot's and mechanic's forms which calls attention to the necessity of two identical pictures of the applicant, showing front and side view. "Gradually, by the word 'gradually' was the point of emphasis, however, the pictures required to be clearly 'head and shoulders only,' the applicant having removed all clothing for the pose. It is a revelation to see just what can be gotten on a photograph just $\frac{1}{2}$ by $\frac{1}{2}$ inches in size. They range from undramati-

head and shoulders "only" to a full length of the applicant with a background varying from an airplane to a bevy of girl friends.

The accompanying certificate of aircraft will give the name of the pilot, name and date when a license may be issued. At first glance, it would appear that the powerplant and type is as evidence, but when one considers that this work is nationwide in scope, that a district supervising inspector is responsible for an area equal to one-tenth of the United States and that the registration section must have sufficient records to intelligently answer any interrogatory correspondence, the scope as charted above is very definite indeed.

THE REGISTRATION SECTION is divided into eight sections, each having a different procedure and each division subsection on the chart shown in the preceding project. The applicant submits application in duplicate. The applications are received and checked by the application group. Any error in an application is corrected either by correspondence or by the return of the application. The original copy of the application then goes to the file group for any future reference. The duplicate copy is forwarded to the license group, which checks for method approved in case of pilot only and forwards all classes of applications to the supervisor of the district in which the applicant desires to be examined. After examination or inspection, as the case may be, the application and related examinations are returned to the license group which checks for con-



Registration chart of the licensing service

tinence of applications are being received with tests attached, direct from the supervisor.

Every effort has been made to develop a system of transfer of title of aircraft which will be legally sound yet simple enough to expedite transfer. When a transfer is made, it is necessary to ascertain whether temporary license or identification is, from time to time, "Record," "Transfer," and "Registration" is also issued to the owner of the aircraft. This form is evidence of title for the purpose of registration and, when properly completed and returned to the Department of Commerce, is sufficient evidence for a transfer of the title and a management of the operation or license to the new owner.

UNTIL VERY RECENTLY an aircraft could not be licensed in the name of the purchaser where the purchaser could not obtain a bill of sale showing that the aircraft had been paid for in full. A system of file recording has now been developed whereby this can be accomplished.

Before the airplane license may be issued the applicant for license must supply the applicant with a certified copy of bill of sale conveying title to the aircraft to himself. For this purpose, copy of bill of sale is required.

The purchaser or operating agency should be supplied with a bill of sale conveying legal title to the applicant. The financing agency should take back any type of instrument desirable and thus department should be notified of the bill received by a notice of bill in the form of an affidavit, substantially as follows: (See Fig. 1)

The foregoing affidavit is for the protection of the financing agency and the responsibility for its completion and forwarding to the Department of Commerce by the applicant rests entirely with the agency.

If the financing agency will supply a clear bill of sale and a notice of bill as described, license will be issued to the owner and stamped "Subject to Lien."

When the bill is satisfied the financing agency should supply this department with a notice of release, reading substantially as in Fig. 2.

Upon receipt of this notice by the Department, the registration bill will be released and license will be issued to the name of the purchaser without "Subject to Lien" being stamped thereon.

A widespread comment has been expressed in the new pilot's ratings. The rating system was developed through the desirability of securing a closer classification of those pilots licensed to carry passengers for hire. The Air Commerce Regulations were revised to include the new rating system, effective as of Sept. 1, 1929, and are now being issued.

Form 1 REGISTRATION AUTHORITY FORM FOR 1929-1930				
Authority to issue license to carry passengers for hire in the aircraft listed below				
Class	Name	Address	Number of passengers	Comments
CLASS I	1. Name	Address	Comments	
CLASS II	2. Name	Address	Comments	
CLASS III	3. Name	Address	Comments	
CLASS IV	4. Name	Address	Comments	
CLASS V	5. Name	Address	Comments	
CLASS VI	6. Name	Address	Comments	
CLASS VII	7. Name	Address	Comments	
CLASS VIII	8. Name	Address	Comments	
CLASS IX	9. Name	Address	Comments	
CLASS X	10. Name	Address	Comments	
CLASS XI	11. Name	Address	Comments	
CLASS XII	12. Name	Address	Comments	
CLASS XIII	13. Name	Address	Comments	
CLASS XIV	14. Name	Address	Comments	
CLASS XV	15. Name	Address	Comments	
CLASS XVI	16. Name	Address	Comments	
CLASS XVII	17. Name	Address	Comments	
CLASS XVIII	18. Name	Address	Comments	
CLASS XIX	19. Name	Address	Comments	
CLASS XX	20. Name	Address	Comments	
CLASS XXI	21. Name	Address	Comments	
CLASS XXII	22. Name	Address	Comments	
CLASS XXIII	23. Name	Address	Comments	
CLASS XXIV	24. Name	Address	Comments	
CLASS XXV	25. Name	Address	Comments	
CLASS XXVI	26. Name	Address	Comments	
CLASS XXVII	27. Name	Address	Comments	
CLASS XXVIII	28. Name	Address	Comments	
CLASS XXIX	29. Name	Address	Comments	
CLASS XXX	30. Name	Address	Comments	
CLASS XXXI	31. Name	Address	Comments	
CLASS XXXII	32. Name	Address	Comments	
CLASS XXXIII	33. Name	Address	Comments	
CLASS XXXIV	34. Name	Address	Comments	
CLASS XXXV	35. Name	Address	Comments	
CLASS XXXVI	36. Name	Address	Comments	
CLASS XXXVII	37. Name	Address	Comments	
CLASS XXXVIII	38. Name	Address	Comments	
CLASS XXXIX	39. Name	Address	Comments	
CLASS XL	40. Name	Address	Comments	
CLASS XLI	41. Name	Address	Comments	
CLASS XLII	42. Name	Address	Comments	
CLASS XLIII	43. Name	Address	Comments	
CLASS XLIV	44. Name	Address	Comments	
CLASS XLV	45. Name	Address	Comments	
CLASS XLVI	46. Name	Address	Comments	
CLASS XLVII	47. Name	Address	Comments	
CLASS XLVIII	48. Name	Address	Comments	
CLASS XLIX	49. Name	Address	Comments	
CLASS L	50. Name	Address	Comments	
CLASS LI	51. Name	Address	Comments	
CLASS LII	52. Name	Address	Comments	
CLASS LIII	53. Name	Address	Comments	
CLASS LIV	54. Name	Address	Comments	
CLASS LV	55. Name	Address	Comments	
CLASS LX	56. Name	Address	Comments	
CLASS LXI	57. Name	Address	Comments	
CLASS LXII	58. Name	Address	Comments	
CLASS LXIII	59. Name	Address	Comments	
CLASS LXIV	60. Name	Address	Comments	
CLASS LXV	61. Name	Address	Comments	
CLASS LXVI	62. Name	Address	Comments	
CLASS LXVII	63. Name	Address	Comments	
CLASS LXVIII	64. Name	Address	Comments	
CLASS LXIX	65. Name	Address	Comments	
CLASS LXX	66. Name	Address	Comments	
CLASS LXI	67. Name	Address	Comments	
CLASS LXII	68. Name	Address	Comments	
CLASS LXIII	69. Name	Address	Comments	
CLASS LXIV	70. Name	Address	Comments	
CLASS LXV	71. Name	Address	Comments	
CLASS LXVI	72. Name	Address	Comments	
CLASS LXVII	73. Name	Address	Comments	
CLASS LXVIII	74. Name	Address	Comments	
CLASS LXIX	75. Name	Address	Comments	
CLASS LXX	76. Name	Address	Comments	
CLASS LXI	77. Name	Address	Comments	
CLASS LXII	78. Name	Address	Comments	
CLASS LXIII	79. Name	Address	Comments	
CLASS LXIV	80. Name	Address	Comments	
CLASS LXV	81. Name	Address	Comments	
CLASS LXVI	82. Name	Address	Comments	
CLASS LXVII	83. Name	Address	Comments	
CLASS LXVIII	84. Name	Address	Comments	
CLASS LXIX	85. Name	Address	Comments	
CLASS LXX	86. Name	Address	Comments	
CLASS LXI	87. Name	Address	Comments	
CLASS LXII	88. Name	Address	Comments	
CLASS LXIII	89. Name	Address	Comments	
CLASS LXIV	90. Name	Address	Comments	
CLASS LXV	91. Name	Address	Comments	
CLASS LXVI	92. Name	Address	Comments	
CLASS LXVII	93. Name	Address	Comments	
CLASS LXVIII	94. Name	Address	Comments	
CLASS LXIX	95. Name	Address	Comments	
CLASS LXX	96. Name	Address	Comments	
CLASS LXI	97. Name	Address	Comments	
CLASS LXII	98. Name	Address	Comments	
CLASS LXIII	99. Name	Address	Comments	
CLASS LXIV	100. Name	Address	Comments	

Print name
Name of financing agency

plements and then forwarded them to the proper Boarding group. The license is mailed direct to the applicant from the licensing group.

However, one look at the chart shows the vast saving in time and expense that could be saved if application were submitted direct to the district supervisor rather than the Washington office. The possibilities of this procedure have long been recognized, but before making it effective the field offices will have to be strengthened and organized to assume the additional duties. This is almost accomplished, and at the present time a fair per-

The new license is radically different from the old license, both in size and content. Transport and liaison commercial pilots are issued rating sheets in conjunction with their licenses.

The identification portion of the license consists of name, description, general classification of transport or liaison commercial pilot, and date for periodic review. The identification sheet, without the accompanying rating sheet, permits the holder to pilot all types and classes of licensed aircraft but does not permit the holder to carry passengers for hire. The identification sheet will be issued by the Department of Commerce at Washington and is designed to cover a five-year period. The periodic one-month renewals will be accomplished through the inspectors in the field and without any contact with the Washington office.

THE RATING SHEET, when properly endorsed by a Department of Commerce inspector, designates those types and classes of licensed aircraft in which the holder is authorized to carry passengers for hire and, like the identification card, is designed to cover a five-year period.

Transport and liaison commercial pilots carrying passengers for hire will be rated according to these sheets. Each rating must be qualified for the individual and the fact that a pilot qualifies for the one rating rating does not necessarily qualify him for the lower rating.

The holder for private and liaison commercial pilots is required to conform to the new transport and liaison commercial licenses, but will still receive a rating sheet identical as both private and industrial pilots are prohibited from carrying passengers for hire by the Air Commerce Regulations. These licenses also are designed to cover a five-year period, and the prescribed yearly renewal is to be accomplished through the inspectors in the field and without any contact with the Washington office.

An application for rating sheet is to be submitted to the transport or liaison pilot's license of the old form, this office will issue the identification half of the new license arranged for a 60-day letter of authority. As previously stated, the identification portion of the license authorizes the holder to pilot all types of licensed aircraft, but does not

authorize the carrying of passengers for hire. However, the letter of authority does authorize the holder to carry passengers for hire in licensed aircraft for a period of 60 days and under the same terms as the old license. Within the 60 days it will be necessary for the holder to secure a rating sheet designating the types and classes of licensed aircraft in which the holder desires to carry passengers for hire.

This rating can be obtained from the same Department of Commerce inspector upon suitable documentation of ability to pilot the various types and classes of aircraft for which a rating is requested. These rating sheets will be issued solely by the inspectors in the field and not from the Washington office.

The new license for private and industrial pilots will also be rated as renewals of the old licenses, and since no rating sheet is available, will be issued as a straight rating sheet.

Locally, stand by the aeronautical industry, it is conceivable to assume that many more changes will be necessary in future licensing forms and practices. However, in the light of past experience such changes can be accomplished without delay or misunderstanding to the applicants.

This is to certify that a Bill has been enacted for the establishment of a new Department of Commerce, in the place of the present Department of Commerce.

It is requested that this notice be recorded with the Aviation Branch of the Department of Commerce.

Washington, D. C., January 2, 1930.

John T. McLean, Commissioner of Mails.

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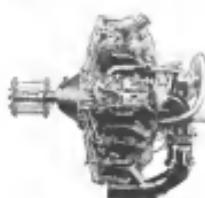
John T. McLean, Commissioner of Mails.

Washington, D. C., January 2, 1930.

John T. McLean, Commissioner of Mails.

to 1. Weight complete with tank, 902 lb. Maximum power at 2,000 rpm, 1,270 hp and maximum power, 550 hp at 1,550 rpm. The consumption is 64.60 lb. of gas per hr. and \$0.04 lb. avg. of oil.

Starting by means of compressed air acting on the main cylinders of the rear two. Mixture is provided by



The Salmson 9A2.

two double carburetors placed at the rear end and fitted with altitude control, mixture pipe are buried.

Ignition is by new Salmson 4202 magneto, with two planes per cylinder. Lubrication is by the pressure feed principle, on the dry sump principle. A system of siphons can be fitted in the form of a circular manifold with exhaust extraction.

The tail surfaces are constructed of chrome molybdenum and brazed or riveted to the fuselage. The rubber wheel landing gear is of the type which has a foot bar as an angular lever of 20 deg. The tires have an air pressure of 100 psi. The range is 1,000 miles at 100 mph, the weight of the fuel tank and tail surfaces, excluding the engine, is 180 lb. including the engine mount.

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The engines are controlled by separate push and pull tubes—out to each cylinder and back to the engine. The tubes pass on the outside in the back part of the fuselage. There are readily replaceable in each cockpit and the standard equipment includes two Dual Safety control sticks.

The standard consists of a split length equipment which can be released instantly by the pilot by means of a release cable. This disengages the tail surfaces.

Another way easier than pulling has been used to replace the rear cockpit. Seats are made of aluminum and are adjustable so that the pilot can assume a position of his own choice. A large comfortable seat large enough to have two passengers has been arranged in front of the forward cockpit. It is

reached by a small hatch on the top of the fuselage.

The fuselage and wings are covered with Grade A chrome fabric with the conventional double seam. The rudder in the rear is made of sheet aluminum and is built loose and drawn on before stretching in the ribs. Gasholder webs have been used with aluminum discs for stretching.

Standard equipment will include a set of cockpit instruments, compass, altimeter, indicator, oil, temperature, and pressure gauges, and an oil speed indicator.

The standard equipment of the front cockpit and the struts is gathered after the Navy strut, master carburetor, modified, or Navy strut, master carburetor. Two windshields on the two cockpits will help in the crosshairs.

The standard equipment of the rear cockpit is the same as the front. The engine is a Salmson Mark 111, four cylinder air-cooled radial, has enclosed cowlings on the top to get exceptional streamlining in the cowlings. The exhaust pipe runs down with the engine, the engine is mounted on the rear and the fire wall and has an exit in the middle of the rear side of the cowling.

The plane will be produced in quantity soon by the Aircraft Builders Association, Inc., a group of 120 National Flying System, incorporated under the laws of Oregon. J. K. Karpins, president of the Aircraft Builders Association, will act as managing manager of the association. E. G. Gandy, formerly with General Motors, will have charge of production. Lieutenant Reed B. Smith will be consulting engineer and chief test pilot and Dr. E. G. Gandy will be the technical representative.

The distributing organization of the First National Flying System will be the 120 schools which are in the course of opening. A new unit, to be created by the Radio Systems Inc., another subsidiary, for the uniform supply of instruction. J. Karpins is president of the Standard Systems Inc., which is the distributor.

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Student Prince TRAINING PLANE

The "Student Prince" has

been built by the plane's manufacturer, Aircraft Builders, Inc., Portland, Ore. The most noticeable engineering feature of the plane is the unique sliding landing gear.

Another unique, working on a simple principle, takes away every hop on landing.

Exceptional visibility, gained by cut-



The "Student Prince" training plane.

GENERAL NEWS

Horace E. Powers, News Editor



HIGH POINTS in the NEWS

They are presented for March 1, 1938, a publication of the American Chamber of Commerce, and are intended to present the news in their regular form.

Waco Reduces Price of 150 Model to \$3,250

► A kindly, representative, prudently, Aero Chamber of Commerce advises 112 per cent growth in membership during 1937. It also says that, with present actions, the body now represents 93 per cent of the aircraft industry.

► House moves forward. At recent meeting of Chamber, increase from 21 to 27 in membership of the Board is recommended for vote at March 2 gathering. Governors selected by the voting committee will be elected at that time.

► House through state. Firm Florida air war down at Jacksonville, with some thirty planes touching at eighteen cities. Enjoyed as route: display, meets, banquets.

► Flying up. Exports for 29 shown by Washington figures to have reached \$10,000,000, an increase over 50 per cent.

► Good against恶. Coughlin-Wright, Carter-Bell Aerways, Southern Western, and Texas Airplane Corp. join in South with a capital \$1,150. Aero Builders of \$400,000, 1929 business in California.

► Another wins. Western Air Express and Aero Corporation of California, arranging consolidation.

► Fingers with the radio. C.A.M. representatives have been naming in Washington, and it is evident that a system will shortly be devised based on a filing rate scale proposed by Postmaster General Brown. Post zone operators will get \$1 per mile per 1,000 lbs. to 200.

► Safety hardware. Racing West Coast residents in basis of new ruling that passenger planes must not fly beneath 500 ft. level except on taking off or landing. Craft pressed below by weather conditions are to be brought down as soon as possible.

► More for Tri-Cities. France, which had been appropriated of \$25,000,000 for 29, will get from \$76,400,000 (Finance committee estimate) to \$81,900,000 (conservative request) for 29/30.

Ryan to Offer New Four-Place

ST. LOUIS (con't)—Announcing plans for large production of its craft in 1938, Ryan Brothers of the Detroit Aircraft Corp. stated that the company will add, the 1937 Ryan 140, the B-2 Waco model, and an entirely new four-place cabin craft, the C-1 Pacer. The latter is designed as a smaller but expensive airplane to sell for \$10,500.

Waco Reduces Price of 150 Model to \$3,250

► The Waco 150 Model—Officials of the Waco Aircraft Co. announce a reduction of \$600 in the price of the Hispano-powered Waco 150 to \$3,250 to reflect the present market. The Waco 150 is the same craft as the Waco equipped with the 180 hp Hispano-Suiza engine, will also only apply to planes presented with the engine now in use at the factory here.

► This is the result of the price of the plane having been increased, formerly sold for \$3,850. Less engine and less propeller, the model is to cost but \$1,200 less instead of \$600. Less engine and less propeller, the model is to cost but \$1,200 less instead of \$600.

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Consolidated Net \$1.50 a Share

BUFFALO (con't)—Consolidated Aircraft Corp. net earnings for 1937 are shown in a preliminary report to stockholders as \$1.50 per share after charges against operating costs.

Chamber Report Discloses Growth

Membership Up 112%; Body Now Has 14 Sections

► (con't)—With an increase of 112 per cent in the membership of the American Chamber of Commerce during the past year, that body now represents 93 per cent of the aircraft industry. This was reported at a recent meeting of the parts of the association by E. H. Knobell, president.

At this time of 1937 the membership was 486 while at the end of the year it was 1,060, or 100 per cent. The parts which include distributors and dealers in aircraft and aircraft accessories, flying schools, air traffic agencies and organizations rendering specialized services to aviation, shows the largest gain in membership, jumping from 112 to 225.

► New Department. There are now four distinct working sections in the American Chamber of Commerce and among those formed during the past year were the chamber and dealer section, air traffic section, aircraft accessories section, aircraft service section, aircraft and equipment section, legal and legislative research section and the management of a technical service bureau in Washington.

► The division grows over to material and equipment with some of its time in gathering special statistics from trade publications and in doing so it is able to know where the firm stands for its members, material and equipment has.

► The same frequency allocation table used for the air transport section is to be tried in the new body, but it will be adjusted by the Federal Radio Commission with very few changes, according to Mr. Knobell.

Air Transport Division Action

The American Chamber of Commerce, organized at the First National Air Traffic Conference held at Kansas City during the middle of September, has had many delegations representing 29 transportation companies, including the largest road and railroads, the largest port, a through air terminal, and the largest bus line in the country.

Another strength of this conference was that it was attended by the Chamber, which is a major air transportation organization. Large business organizations throughout the country were represented by the Chamber in an effort to have them appear air

(continued on next page)

**Name "Curtiss-Wright
Airports Corp." Adopted**

NEW YORK (c-w)—The name of Curtiss-Wright Airports Corp. has been adopted by the former Curtiss-Wright and the Curtiss Airports Corp., which has offices at the Curtiss-Wright Building, 22 West 50th Street, this city. The company in the same office adopted a system of the two companies working together. The title "A Curtiss-Wright Firm," will follow the local name of each subsidiary, the Bronx airport at Caldwells, N. Y., will be known as Bronx Airports.

The title will apply to the following, in addition to the above: Curtiss Airport Valley Stream, N. Y.; Curtiss-Wright Airport, Baltimore; Bronx Airport, Philadelphia; Curtiss-Stamford Airport, Stamford; Curtiss-Wright Airport, Chicago; Curtiss-Wright Airport, San Francisco; Curtiss Grand Central Airport, Los Angeles; Radley Airport, Plainfield, N. J.; North Beach Airport, East River, N. Y.

It has been decided to build commercial terminals, as well, at the two largest projects, Bronx Airport, New York City, Curtiss-Wright Airport, Houston, and Grand Central Airport, Sessions, N. J.

**Hinsburg on Annual
Inspection of Airways**

WASHINGTON (c-w)—Capt. R. C. Hinsburg, chief of the airways division of the Aeronautics Board, left Washington Jan. 22 for his annual tour of inspection of the airways.

During his inspection Hinsburg will review changes he will probably see in December. New York-Cleveland-Chicago-Athens-Los Angeles-San Francisco-Salt Lake City, Los Angeles, and back to Washington through the Captain's Route.

In Los Angeles Captain Hinsburg will probably inspect the new aeronautical information facilities and the new airport maintenance facilities. The Federal Telegraph Co. lights on the Main-Jacksons Creek route are being turned on as planned.

Consider Air Traffic Changes

WASHINGTON (c-w)—A conference of the greatest importance to the industry was held Jan. 29 when four operators, representing the four major air carriers, met with Maj. Clarence D. Young to review certain of the Air Commerce Regulations and formulate new measures to ensure greater safety in passenger flying. Among the proposed changes discussed were the revision of regulations requiring passenger planes to carry two-way radio communication equipment, the inspection of ground radios, and the shortening of the 500-ft minimum altitude limitations for passenger planes flying over open country at 4,000 ft.

Boeing in New Chepman Plant

SEATTLE (c-w)—Operating headquarters of Boeing Air Transport have been moved into a new \$65,000 building at the local airport on Jan. 18. A 100-ft tower for planes to use as radio marks, landing and slope, has also been completed. In the administration building is a waiting room and restaurant on second floor, and a lounge on the first floor. The new plant is to be completed in April.

The new plant will be the following:

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**T.A.T.-Madux Gets
More Passenger Traffic**

ST. LOUIS (c-w)—New records for travel to Transoceanic Air Transport's Madux Air Lines have been made as a result of the recent rate reduction, according to a figure made public on Jan. 27. Chicago is the largest traffic manager of the line. In the week following the reduction, effective Jan. 14, a total of 222 round-trip passengers were carried over some portion of the line. Forty-five of these were through passengers, and 177 were passengers on the remaining 186 seat local passengers between intermediate points.

The record officials pointed out was made on the line of the eastern transoceanic air lines which has been maintained throughout the week, carrying two full days of operations to be recorded and parts of schedules to be canceled on about every other day. On three days the line was closed, and on the other two days it was suspended and then again resumed.

A scheduled list of an air-mail pickup service on the part of a New York telephone company, the Bell Telephone Department, because of the low flight rating involved.

East Coast Aircraft Co., Boston, Air-

port has just concluded its busy duty until midnight, and next winter expects to offer 24-hr. overhead and repair service.

Position positions for maintenance and repair of 300 aircraft.

Boeing has been created by the private and service contractors, with specialized subversives ranging from \$300,000 per month for manager to clerks at \$20 per month.

George R. Hall, vice-president in charge of the service to be rendered by Mr. Brown, it is believed, said as the \$30,000 maximum in the present legislation to be written in the way of a safety regulation, in order to provide a key for voluntary regulation between the Postmaster General and the operators.

Phil Johnson of Boeing Col. Paul Hendren of S.A.T. and Capt. George Young, to review certain of the Air Commerce Regulations and formulate new measures to ensure greater safety in passenger flying. Among the proposed changes discussed were the revision of regulations requiring passenger planes to carry two-way radio communication equipment, the inspection of ground radios, and the shortening of the 500-ft minimum altitude limitations for passenger planes flying over open country at 4,000 ft.

The operators, it is believed, had the plan outlined in his mind. Captain Young is said since the beginning of the new year constant negotiations, and has waited to present it in order to obtain all possible information and agreement from the industry.

Airway Briefs

Boston selected for flying as the Boston airport, reported by the committee of commissioners, included: Cleveland-Philadelphia-Jacksonville-Richmond-San Diego-Fort Worth, Port-Worth-Louisville. The Postmaster General and San Antonio-Matthews Airports are to be considered to be completed in April.

The annual license incomes de-

clared by Sperry Incomer Co., and

by Easterner Doublette in his third

flight last fall, is now being used on

mail and passenger planes by R. A. T. and T. A. T.-Madux lines, N. A. T. and T. A. T. are now Curtiss-Corner Stearns II mail planes on the Chicago

New York run.

On Jan. 15, the 1,450 planes in mail and freight in Cleveland was donated, according to Postmaster General Charles E. Smith, because of a decline in traffic. "Woodhull" air mail will now be carried by the Postmaster General at 30,000 ft. The line is operated by Colonial Western Airways.

Arthur G. Spens, President, 246 years of Sperry Aircraft Corp. of Springfield, Mass., has announced plans for passenger service between Boston and Montreal, with Portland as the base. The fare will probably be about \$50.

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FOREIGN ACTIVITIES

**Dutch Companies Make
Agreement With French**

THE HAGUE (Netherlands)—KLM has made an agreement for co-operating with the French company, Air-Asie, on the Paris-Haag-Brussels section of the present route to the Dutch East Indies. KLM and Air-Asie will be co-operating with the French Farman company to avoid duplication of the Paris-Amsterdam route, and branches of KLM at Paris, and of Farman at Rotterdam and Amsterdam, will be co-operating. Both companies have a working agreement with Belgian Sudavia Company to expand its share business in Brussels and Antwerp.

Expansion of services and arrangement for co-operation with other European routes will be effected by KLM and K.M. K.L.M. The latter company is continuing its weekly services between Brussels and Paris, and KLM has agreed to expand the route to Paris by Daily service has been inaugurated between Brussels and Santander, and in April this line will be extended to Santander when an emergency landing field is available at Santander. Early in April it will be connected to Madrid.

**British Organize
Gliding Association**

LONDON (England)—Air Vice-Marshal Sir Leslie Hinsburg has established the British Gliding Association, which has just been formed to develop the gliding movement in England. Its first meeting will be held on March 23.

The first meeting of the association is the Royal Aeroplane Society, Alternative Street, London.

In a recent interview L. Howard-Plaisted, director honorary secretary, stated that the association will be able to offer other educational services, including various parts of the United Kingdom to negotiate with the Air Ministry, the Royal Aeronautical Society, and the Royal Aero Club on the technical and scientific aspects of gliding.

Up to now, Capt. George Young,

principally the only source of supply for the oil. Grants of money have been made to two airports which are seeking to stimulate production.

Germany to Limit Plane Orders

BERLIN (Germany)—The recent decision of the German government to limit the number of aircraft and planes ordered by firms from 1938 to 1940, has been partially revised. It seems certain that every though the exact figures are not yet available, the amount of the limitation will be considerably larger than the \$67,500,000 voted for 1939. The government has asked \$61,000,000, and the finance committee has voted \$60,000,000, and the budget for 1940 is \$70,000,000. The main reason given for the increased expenditure is the increase in power of planes since 1938 or to be purchased. On the other hand, some believe that the increase is due to the use of lighter planes for training. Deployment of light planes for private use is also to be encouraged.

Some of the more important items in the proposed budget are as follows: Service aircraft budget, \$10,000,000; aircraft maintenance, \$11,250,000; aircraft fuel, \$10,600,000; fuel, supplies, \$3,450,000; subsidies to transport companies, \$16,000,000; aircraft and aircraft engines, \$15,000,000; plane and balloons, \$6,315,000; pay for the Air Force \$10,600,000. Special sums of \$1,570,000 and \$1,449,000 respectively are set aside for the purchase of new types of land and seaplanes by the Air Ministry.

Mexican Aviation Year 061

MEXICO CITY (Mexico)—The Mexican Association of Aviators, a non-governmental organization, has just celebrated its first anniversary. This Association recently organized Aviation Weeks, the first affair of its kind to be held in Mexico. The organization is supported by the government, and is composed of 150 members among whom are some of the most prominent aviators in the country. The Association maintains a library, a technical section, and a technical school, and is affiliated with a certain number of its members. The members comprise, for the most part, men of the military and naval services, with those of smaller schools in the United States, and cover class room and laboratory work for 300 hours. Aviation Weeks will be held every year.

Four flying clubs have been formed among the members and several glider clubs are being organized. While this Association is not a trade organization, its sole purpose being to develop flying interests among its members, it is open to friendly foreign firms and organizations with all information regarding aeronautical activities in Mexico.

The Surrey Two-Place Light Sport and School Plane



THE MADRID was produced by Surrey (England) Flying Services. Specifications were published in the Nov. 9 issue of AVIATION. The units are arranged side-by-side with an arm rest between. A coupe top may be installed to give it cabin features.

Four French Pioneers



Four pioneers of French aviation, M. Faure, Sénior-Dumont, Béniot and Vélez (left to right) return to Issy-les-Moulineaux where an airplane race for the Grand Prix de l'Aviation was held in 1909. The contestants represented M. Faure's victory in a Vélez biplane.

Exhibit to Expand Activities

ELMA (PROV.)—Faroct Aviation Co., distributor of Faroct aircraft, has the rights and responsibilities of Huit-Saint-Diziers, Inc., aeroplane manufacturers of expansion of activity in the country. The concern has been operating with a small staff, but has now increased its personnel to 100. The company has been engaged in the manufacture of aircraft, and is to have charge of the central defense operations to be undertaken by the Farocet company.

English Air Trains 8.17 Per Mile

LONDON (ENGLAND)—A rate of about 8.17 pds. per mile is to be charged for air taxi services operated by National Flying Services, Ltd., the government's first and only authorized aviation company in the country. Six of the company's three-place cabin monoplanes, of an order of 55 have been delivered in the Bournemouth air park for insurance use in the winter.

Mexico Plane Plant Opens

MEXICO CITY (CITY)—An aircraft plant has been opened here under the direction of Gen. José C. Abarca, chief of the Department of Aeronautics of the Ministry of War and Marine and Gen. Adolfo Ruiz Cortines, Governor of the Federal District and Territory of Los Cabos. The plant will manufacture military and civilian planes, it is announced. Messes will be exclusively employed in working for the same. Engineers will be engaged for technical planes, according to the announcement.

Foreign Briefs

Importers are in progress between Imperial Airways and Manchester Air Transport Co. for management of a series of 100 aircraft, and the two companies are in agreement to manage, in concert with Imperial Airways' continued services at Croydon.

The first plane, recently released on loan after having been leased to the Post Office, will be equipped with Pobjoy power plants and five Pobjoy engines, and is to be shipped to the new airport at Tengah, Singapore, Borneo, for the use of the British East Indian Mail.

Julius H. Hayes of Aeromarine is sponsoring a campaign to encourage growing of certain hedges in hilly, to provide easier fuel for airplane engines.

A British airplane carrying twenty passengers recently flew from London to Paris, and the first passengers to return to Britain after a long stay in France, according to the British Ministry of Transport.

Unsubstantiated, mentioned by Quaker Loughheed, Queensland, Australia, is reported to be 61,000 mi., 47 per cent of the total distance traveled by passengers in 1930, according to the British Ministry of Transport.

New Tanks Produced

PRAGUE (CZECHOSLOVAKIA)—A new tank, the design of which was developed by the British Empire, has been produced in Prague during the World War. This machine is a tankette, cable suspension, provided with a 40 kg. gun. The tanks are in tandem and large armament is provided for mobility instead of numbers. The specifications are: Span 36 ft. 8 in. length 19 ft. 8 in. weight 3 ft. 11 in. width 4 ft. 11 in. weight 150 kg. load 100 kg. tank.

Capt. Miguel Callejas is making a 10,000-ton port of Santos to be used as an air base and will enter the flying field with six machines bought from Albatros and two others which have been added from the British Empire. The planes have been well patronized. The pilots are M. E. J. Faure, M. Henry E. Elford, M. Charles Goy and Mr. W. E. Carter. M. Elford has been named manager of the port and is to have charge of the central defense operations to be undertaken by the Farocet company.

Two aircraft, one a Farocet and the other a Faroct, have been delivered to the British Empire.

Bernard Monoplane Flies 310 M.P.H.



This is the Bernard monoplane equipped with a 1,000 hp. Hispano-Suiza engine with which Pilot Pichot has been making speed trials. Recently at Bourges the machine was flown at a speed reported to be about 310 m.p.h.

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THE BUYER'S LOG BOOK



110 TRADE CATALOGS will

LAWYER TRUNKS—Several types of Lawyer trunks are illustrated and described briefly in a folder lately issued by the Accordion Companies, manufacturers of the product. The pictures are for accurate measure, loads and losses.

SHOWER ENCLOSURES—For various types of shower rooms, and to those who are interested in the installation of steel or wrought iron piping, is the latest publication of the Leslie Air Products Company entitled "Detailed Construction for Modern Shower Services." The book is general in character and the accompanying leaflet applies to particular fields of piping construction.

U-1 Clock

THE U. S. Fire Recording Co., New York, Inc., 312 West 45th Street, New York City has recently placed on the market the U-1 Clock, an instrument for recording engine and flywheel speeds.



Detail view of the U-1 Clock

helps to stop the escape of lubricating oil from the piston ring groove and to use it in sealing the piston groove oil and gas passage and piston ring.

WESTINGHOUSE CHARGER—A new Westinghouse charger employing the copper oxide principle is now available in a 100 ampere model. The Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa. To operate the charger, it is necessary only to plug



Westinghouse Charger

into any available lamp socket, attach the ground lead to the battery materials and turn on the switch mounted on top of the charger for a few hours. Being light in weight, the charger can be moved easily. There are no parts to be taken out except the wires and the two leads present both the hot and the neutral. No chemicals or acids are used, eliminating danger of explosion or corrosion damage.

The auxiliary rectifier made from copper or dry-type rectifier made from copper. The copper oxide principle of rectification takes advantage of the electrical properties of copper oxide with a low voltage drop. The current flowing in this way allows electric current to pass in one direction only and there is no electrolysis or chemical action.

Robbins & Myers Hoist

THE HOIST & CRANE DIVISION of the Robbins & Myers Company, Springfield, Ohio, announces a complete line of electric hoists in sizes ranging from 1 to 75 ton capacity. The outstanding features of the new hoists include a compact truck design, a wide range of lifts and a variable bottom block which reduces the range on the sheaves and sheaves all parts so as to give itself easily into the rope when the sheaves are turned. The hoists are equipped with safety blocks, wear blocks and gripping of alloy steel heat treated. The main hoist is an Al-Anolute alloy metal having a tensile strength of 30,000 lb. per sq. in. An aluminum finish is applied throughout.

Brill Airplane Chair

A NEW AIRPLANE CHAIR, weighing only 10 lbs., has been designed by the J. Q. Brill Company, Philadelphia, Pa. The chair is constructed principally of aluminized steel, the spars in aluminum alloy, piping in aluminum and light weight leather. The framework is aluminum and the leather cushion support and back. The cushion and backrest are padded and upholstered in a lifting manner.



The New Brill Chair

James' Defroster

AN INSECTICIDE APPARATUS which wards off insects, was developed and patented by the James' Defroster Co., Philadelphia, Pa., to fill the demand for a quick disinfecting ring. The rings are made up of four sections, the first three being attached from cast iron and the fourth section being a thin sheet of spring steel. disinfecting does not depend on exterior wall pressure but makes use of an air bell built up in the application of one light expansion air set on the bottom of the groove below the ring. The air is then expanded and the other causing a side expansion in the ring groove. Each of these

four metal heads and covering caps are used on this device, as they are made resistant to heat. They are made in three sizes, ranging. The largest is about 41 in. in diameter. No. 1 being made for a 6 volt battery and No. 2 for a 12 volt battery.

apply this principle to the unopposed movement of flow conditions about aircraft sections.

It was found that a considerable increase in lift and a reduction in drag resulted from the reduction or removal of the induced region in the wake of very high lift sections. Stepped lift coefficients of 1.1, sections with a thickness ratio of approximately 1.0 could be increased



Model used in tests.

up to 20 per cent. Friction-drag coefficients of 0.03 and upward could generally be much improved, whereas some favorable original conditions could not be improved. For example, tests were conducted at Reynolds numbers of approximately 1/10 full scale values, and the results in the expected under full scale conditions cannot be predicted.

Of interest is the fact that all aerodynamic methods of unopposed flow when applied to thick symmetric profiles resulted in zero angle of attack. The possibility of flow about such bodies as aeronautical models not being prevented by boundary layers from reaching the same angle when the section runs gives a few degrees angle of attack.

Elevator Curves

RELATION CURVES FOR DETERMINATION BY MEANS OF FLYING TESTS AND THEIR SIGNIFICANCE FOR THE PREDICTION OF THE STABILITY, By Dr. H. J. K. van der Veen. *Flight and Aerodynamics* (London), Vol. 1, No. 1, February 1939. Price 2/-, 33 pp. (See *Chief Test*, 1-2-Germany)

IN THIS EXTENSIVE REPORT from the Dutch National Institute for Aeronautics, Reynolds full scale investigations on the longitudinal stability of airplanes have been described.

After some general considerations about the forces and moments which act on an airplane the moment coefficients due to the longitudinal motion are divided into two parts, the second of which only depends upon the position of the elevator as a function of the flying speed for a series of stationary movements. From a set of three

curves one can determine how it depends upon angle of incidence and —

—

Later a critical description of the experiments, methods the results are given. The characteristics have been determined for different conditions of the center of gravity, different moments of inertia, different angles of incidence and areas of the tailplane. The effect of position of the elevator on the lift and drag of the wing is also determined. It seems not to be possible to construct curves as a function of the angle of incidence. In the last chapter some theoretical results are given. The results show that the elevator curves are of theoretical and practical importance for the judgment of the longitudinal stability of an airplane with engine running.

The method consists of flying in quest of a series of speeds kept as much as possible constant by an unopposed pitch, at a certain constant angle of attack. (The machine may climb or descend due to speed and throttle.) The position of the elevator control is measured with great precision, and is plotted against speed.

Airfoil Control Tests

WIND TUNNEL TESTS ON AEROMARINE AIRFOILS AND PROPULSION EQUIPMENT FOR AIRCRAFT USE, By Major, BACON, LEWIS, COOPER, U.S. AIR FORCE, and Major, R. J. BURGESS, R.A.C. Technical Note No. 322.

This report presents the results of an investigation to determine the effect of boundary layer control on the lift and drag of an airfoil section with a forward control slot. It covers the second part of a general investigation upon the subject of boundary layer control.

The tests were conducted at full scale Reynolds Numbers in the Propulsion Research Tunnel of the NACA. The propulsive system was a propeller of constant speed driven by a Wright J-5 engine. All tests were made at pitch angles of 15 deg. and 25 deg. at 42 in. radius. The engine was mounted on a cable and was operated from the rear of the aircraft.

The propulsive force for the slot test flights was of Grashof 367 seconds, while the cockpit drag was

eliminated with shielded V-EF baffle plates.

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was also determined for each case.

The greatest increase in maximum lift coefficient of the slotted wing over that of the plain wing was 36 per cent. The greatest decrease in maximum lift coefficient was 27 per cent. (The drag coefficient of the slotted wing included a hypothetical coefficient to account for the power required to move the air through the slot, and then the slot was closed and the losses in the baffle air connecting ducts.) The greatest increase in the ratio of maximum lift coefficient to maximum drag coefficient was 131 per cent.

Wing Effect on Propellers

THE EFFECT OF THE WING ON SINGLE SPAN AIRFOILS AND PROPULSION EQUIPMENT AS SHOWN BY FULL-SCALE WIND-TUNNEL TESTS, By Paul E. Burch and Donald E. Wood. NACA Technical Report No. 322.

This report contains data regarding the effect of the interaction of the propeller and body of an airplane. At previous to this time, little has been known regarding the effect of the wing on propulsive efficiency. This report gives the results of an investigation to determine the interaction between the wings and the propeller.

The tests were conducted at full scale Reynolds Numbers in the Propulsion Research Tunnel of the NACA. The propulsive system was a propeller of constant speed driven by a Wright J-5 engine. All tests were made at pitch angles of 15 deg. and 25 deg. at 42 in. radius. The engine was mounted on a cable and was operated from the rear of the aircraft. The propulsive force for the slot test flights was of Grashof 367 seconds, while the cockpit drag was eliminated with shielded V-EF baffle plates.

The propulsive efficiency

[efficiency = thrust \times volume of advance] \times propulsive power

where the efficiency is that due to the engine thrust divided by the engine thrust of the airplane due to the slipstream, with the wing in place was from 2 to 3 per cent lower than without the wing. Approximately the same results were obtained with the wings as by the baffle wings. The loss in efficiency was slightly greater at high pitch settings.

Nosele Drag

THE DRAG AND INFLUENCE OF A SAILOR ON THE PRESENCE OF A WING, By Gustave H. Jacobs. NACA Technical Note No. 520.

SAILOR tests of a trimotor Fokker F-7 fitted with NACA sailors did not show the expected increase

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in speed over that of the same airplane without the sailor. This was attributed to interference between the sailor and the wing, and as a consequence, the sailor was used to determine the position of the sailor and sailor relative to the wing would best simulate this interference.

A rectangular airfoil of thick section was used in the wind tunnel with an NACA 23012 camber line, the position of the sailor being varied. Different forms of fusing between the wing and sailor were tried. In all cases the propeller was outside the sailor, and the sailor was considered of secondary importance as compared to that of the sailor-camberline. Tests were made



Model used in tests.

at 1 and 20 atmospheres and comparison of the results indicated that sailor effect was also of secondary importance; consequently only the results at 10 atmospheres were given.

The sailor was presented in the form of a series of rectangular blocks, one being used for the various positions of the camberline. Placing the sailor so that it was partially situated within the wing gave the best result. With the sailor in this position, the most desirable because of the camberline effect of the propulsive cylinders on the air flow over the wing, but this observation is largely confirmed by the NACA tests. The position of the sailor for best results was near the front edge of the camberline of the wing. The tests indicated that the drag and interference of a Wright Whirlwind engine mounted with NACA sailors was reduced by 10 per cent. This result was obtained from the sailor as originally applied at 102 ft. sec. to 25 ft. at 100 M.P.H. by changing its position and fitting it into the wing.

Lead in "Pull up"

ON THE MAXIMUM LOAD IN FLYING AND GIVE FIVE VARIOUS DIVERS, By Dr. S. Gorin and H. E. Housner. *Journal Research, Compt. B*, No. 12, 1938.

THE INTEGRATION of the equations of motion for an airplane moving from a vertical disc was found to be possible after certain simplifying assumptions had been made. This permitted the reduction of a formula by which the maximum load on the wings resulting from a given change in angle of the control column in a vertical disc can be calculated with reasonable accuracy for aircraft that are not longitudinally unstable. This formula indicated that the maximum

load on the wings of a given airplane without the camber line was independent of the speed of the disc, for a given pull, and independent of the longitudinal moment of inertia. For longitudinally stable airplanes of given normal loading, in

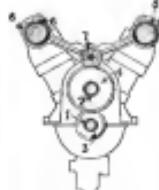
which the margin of the control is constant as the sag increases, "n" for a given pull goes down rather faster than the inverse ratio of the load and the inverse ratio of the linear dimension, where "n" is the maximum load.

New Patents

Can Shaft Driving Mechanism

CANISTER DRIVING MECHANISM FOR INTERNAL-COMBUSTION ENGINES, By William D. Klemm, New York, N. Y. Assigned to First American Corp., Inc., New York, N. Y. U.S. Patent Office, Washington, D. C. Serial No. 2,000,312. Filed June 25, 1937. Inventor, W. D. Klemm. Dated Nov. 13, 1939. Serial No. 2,012,312. Claims 123—125—1.

THE CAN SHAFTS of an airplane engine are designed to be driven directly from the propeller-shaft driving mechanism. The reduction gear



The illustration shows canister shafts 1 driving propeller shaft 2 through reduction gear 3 and driving propeller shafts 4 through gears 5.

on the propeller shaft, which is driven from the engine crank-shaft, is passed to the canister shafts of the several banks of cylinders.

Adjustable Wings

ADJUSTABLE AIRCRAFT WING AND TAIL, By Alexander G. Tamm. Serial No. 2,000,313. Filed Sept. 18, 1937. Inventor, A. G. Tamm. Dated Nov. 13, 1939. Serial No. 2,012,313. Claims 10—12—13.

THE AIRCRAFT AIRPLANE wings are formed with pivoted sections for the purpose of increasing or decreasing the angle of attack corresponding to an increase or decrease in speed. The design is intended to give the pilot control of this angle by operating a handle which has a cable connection to the respective gliders on the wings. The polaris are also actuated by the drift carriage to indicate the wind component.



The illustration shows a composite wing. It is built posteriorly of six separate sections 1 supported by four 2, a central section 3 supported by two 4, and a fore section 5 supported by two 6, movable polaris 22, receiving sections 23 and convergent sections 24.

WING SPANS are designed to actuate the pitch speed scale to indicate air speed at different speeds. A cable 10 is associated with a circular temperature scale having successive markings, and the polaris is also actuated by the drift carriage to indicate the wind component.



SIDE SLIPS

By
Robert R. Orkens

First Reports of "Side Slips" Special Correspondent From the So-Called Sunny South.

With whatever apology you may have to the Ring of Lodore

Dear Editor,

Well sir, I know it may come as a great surprise to you and my dear readers in New Orleans instead of visiting the Mount Show as you expected, I have decided to do this for a couple of reasons, first, you can bring 1 dollar down here and about a week later get the 2000 dollar airplane and I understand by the papers that they are still struggling along without me at that stage although the atmosphere had left off a bit after the people had found out I wasn't going to be there and many letter complaints had been sent to all colors. I wish the managers of those shows would explain to the common people that a fellow like I can't go on all those shows as some game of the United States has to do without my services. A fellow can't be the whole aviation business in the country as long as he is still just because they is holding a show somewhere.

Another reason I leave here was I heard this city was getting wild. I had jokingly mentioned around with what airports being built on all sides as young people didn't bring up this here so I could bring a game. What I mean is I mentioned it a place of course as on account this expression going each end usage I might explain what I meant in the first place. I didn't mean when a chap is arrested that he is guilty or innocent or anything like that, except as pertains to the statute of limitations. It seems he hangs around flying fields as all his spare time as often steals a ride even if he has to pay for it, as made Aviators from time to time an all that. So you see I have here made up to investigate the reports regards this here city getting around, but I am only going to be here a couple of weeks at the most as I may not be able to look into that side of things much on account I

having to look over the golf and horse racing situations first. So that there won't be no report edition of this article, let me explain that this one again is only great devotion to duty, for after all, I am not the only one so much as it seems to be in the horse racing business as a first upstanding man, and then this is an appropriate time for congress to take note of it, the overhanding of golf as an horse racing game of golf than this is an ample production. As I explained to you when I was on there, suppose some of your readers want to know how on distant lines anything regards the golf and horse racing industry, they could stay right at the 1-4, what kind of a correspondent did you have down there anyway.

Well, Ed, let me set you straight when you next report this story with news. When I was down here two years ago it was so cold the golf course was practically ruined as the city only serve business as the whole city was the stimulated grandstand of the Fair grounds track trade. Also the New Orleans—polition of New York had big in up-round operations in account the hotel of Boston was on the Mississippi. Well, Ed, as you can see the aviation inform me this was very unusual as could never happen again in a lifetime. Well like a again I believe of them all I like to say is that either has very short memory or very short lifetimes down here. Everything is just as I was when I left good N. Y. When I was here last traffic was was going on smooth as now this has added to themselves to new colors. I understand that they was unable to get some of the barges through the mouth before the winter comes on, as on new day boats had to turn out to rescue the straying crews. Barges has reached all as also that the reason some of the boats, I set on never showed up at the fields line was on account they being forced down by ice

Yours very truly,
THE INDEPENDENT AVIATOR.

The WACO "235" Straight-Wing, the latest model of the WACO line. Purchased by the State of Florida, it is the first of the WACO planes to be equipped with the new and unique "Side Slips" which are described in great detail.

Speaking
of VALUE

Compare the scores and prices of the first ten airplanes to finish the Fifth National Air Tour. Then WACO value will readily be apparent.

LOOK over the list of the first ten airplanes to finish the 1929 National Air Tour. Check their positions, total point scores, and the advertised list prices.

Note that the first-place WACO has a lead of 7,178 points over the nearest competing make. Note that the winning WACO "235" Straight-Wing, listed at \$7,535, costs but \$1,010 more than the lowest-priced plane among the first ten . . . yet scored 53% more points for all-round performance in the Tour.

Here is proof positive of the superior performance and unequalled value which have made WACO the most popular commercial aircraft in America.

Here are the figures

Place	Score	Price ¹
1	45,672.64	\$7,535
2	41,108.31	7,535
3	38,494.03	48,000
4	35,796.16	85,000
5	33,277.40	14,950
6	31,098.22	14,930
7	29,711.61	6,325
8	28,504.16	6,375
9	28,311.62	6,750
10	25,090.60	35,000



"Ask any pilot!"

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THE WACO AIRCRAFT COMPANY, TROY, OHIO

(*Manufacturer's advertised list price)



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of Maximum
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identifies the *GENUINE* CYCLONE FENCE

All chain link fence is not Cyclone. Other brands may look like Cyclone Fence at first glance. But a close comparison of details proves many points of superiority of Cyclone Fence.

Study the fabric. All Cyclone fabric is made of full gauge copper-coated wire. Coated with a smooth, dense coat of zinc by the "Galvafast" hot-dip process, developed by Cyclone. No uncoated spots, no chipping, no places for rust to start. All strings are heavily galvanized.

Cyclone Fence is erected on U-shaped posts, spaced by taught, the strongest and most durable fence posts made. All posts are set in reinforced concrete foundations.

Every installation of Cyclone Fence is neat and attractive, because Cyclone Fence is erected by our own trained crews. We take complete responsibility for the finished installation. Prompt service everywhere. A Cyclone representative will gladly call and give you the facts about fencing. Write for information.

We also make iron fences and gates, wire mesh of all kinds—window screens, sectional partitions, rubbish baskets, etc.



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*on a production or
experimental basis*

Two Plants for Speedy Service

With

U. S. GREASE GUN

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Clean Neat Aeroplane Dopes

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Also Thinners, Lacquers, Enamels

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The unique feature of Zapon's Cyclic Lubricating Grease is that it has planned a first among all other lubricating materials. A standard for 10 years this unguent material endures and resists

THE ZAPON COMPANY
STAMFORD, CONN.



This Electric Grease Gun Will Never Be Idle At An Airport

The U. S. Electro Hy-Press Grease Gun finds a busy life at any airport. Its services are always in demand. Rockers and rocker arms, landing gear, tail skids, control column assemblies on practically all planes are now equipped with Alonite or Zerk fittings, and demand frequent and thorough lubrication. It is constantly needed also for automobile and truck chassis lubrication.

The U. S. Grease Gun is unequalled for speed and power. There is nothing else like it! Easy for one man to operate; its tremendous power is controlled by the combination valve and switch on the hose giving "pressure shot" operation that conquers any frozen bearings. This instant nozzle control saves grease. Besides these advantages this unit is portable, self-contained, and electrically operated.

There are other famous U. S. "Super Servers" that have been specially designed and adopted for servicing aircraft.

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3 pioneers pass another milestone of dependable service

The passing of 1929 marked the close of another year of dependable service by the air mail . . . that pioneer of commercial aviation.

Likewise, 1929 marked the completion of a year of dependable service by two other pioneers in the aviation industry . . . Stanolind Aviation Gasoline, Stanolind Aero Oil. Early in the history of commercial aviation these two products began to contribute their share to the success of flying. No more convincing proof of the dependability with which they perform can be found than in the record they have made . . . many thousands of flying hours with never an engine failure traceable to any fault in either of these products.

Today Stanolind Aviation Gasoline and Aero Oils are better than ever. Constant research work keeps them up to date to meet the ever changing requirements for aviation fuel and lubrication.

Stanolind Aviation Gasoline and Aero Oils are well known at midwestern airports and preferred by the majority of pilots. These men know that they can rely on Stanolind Aero Products.

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GETTING THEM OFF THE GROUND AND UP!



OUR times Wright's big tri-motor soared over New York, each time laden with Presidents, Treasurers, and Sales Managers of great American companies. Less than one quarter of them had ever flown before. But all were eager to learn for themselves how planes are used in business.

Now, they know the comfort of flying. They know its ease, they could not help being impressed with its speed and its dispatch. In short they know the part in business transportation that the airplane is taking in the life of 1930.

Never mind how many planes were ordered, never mind how many Wright motors were sold, the important part was and is, that fifty big men were brought to flying.

As soon as the business side of aviation is proven practically to forward looking men . . . as soon as aviation's great advantages are experienced in the person, even pre-conceived ideas of its commercial value are raised.

The lesson is simple and not spectacular. The bigger the men who go up . . . the broader their views and the keener their business sense . . . the more readily they accept the advantage that Aviation gives. The better the candidates for the First Flight Club the more far reaching the result!



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